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REVIEW ARTICLES

(1) " The Present Position of Phenothiazine as an Anthelmintic ".

(2) " Trichomoniasis—A Review of Recent Literature ".

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VETERINARY BULLETIN

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DISEASES CAUSED BY BACTERIA AND FUNGI

MILLER, W. T., & HEISHMAN, J. O. (1944). **The Occurrence of Streptococcus Agalactiae in Colostrum of Heifers under Natural Conditions and Following Artificial Exposure.**—*Amer. J. vet. Res.* **5.** 55–59. **1875**

Samples of colostrum from 77 first-calf heifers, collected as soon after calving as possible, were examined for the presence of *Str. agalactiae*. Forty-five of the heifers had come from a heavily infected herd. The other 32 came from various farms and were housed in clean quarters before calving; natural infection with *Str. agalactiae* had never been found in any of the animals in the latter group. *Str. agalactiae* was found in only one of the 77 heifers, this animal being a member of the infected herd.

Three quarters of each of 5 one-year-old virgin heifers were exposed to infection by *Str. agalactiae via* the teat canal, after which the animals were bred. Only two of the 15 quarters thus exposed were found to harbour *Str. agalactiae* at the time of parturition.

—I. W. BROCKLEHURST.

*KOENS, H. (1941). **[Gangrenous Mastitis in Sheep].**—*Tijdschr. Diergeneesk.* **68.** 838–844. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 358]. **1876**

Malignant mastitis is common in the Dutch island of Texel. The incidence in infected flocks is 10–12% and mortality among those affected varies from 45 to 90%. It is suggested that the micrococcus enters the udder through local abrasions and is associated with lowered resistance due to exposure, bad management, of high milk yield.—ANN F. RUSSELL.

STEWARD, J. S. (1944). **Tuberculous Mastitis—Some Surviving Fallacies. [Correspondence].**—*Vet. Rec.* **56.** 50. **1877**

S. challenges the theory that the route of infection of the udder with TB. is by lymphatic extension from the peritoneum. In his opinion, infection is almost invariably by the bloodstream. S. also disagrees with the contention that TB. of the supramammary lymph node is presumptive evidence of tuberculous mastitis. He believes that multiple tuberculous infection of the carcass lymph nodes, including the supramammary, is frequently congenital in origin. Otherwise the supramammary lymph node is infected only after rather prolonged infection of the udder or by infection *via* the bloodstream independently of the udder.—D. D. O.

OTTOSEN, H. E. (1944). Histologisk Undersøgelse af nogle Tilfaelde af Knogletuberkulose hos Svin. **[Histological Examination of Some Cases of Bone TB. in Swine].**—*Maanedsskr. Dyrlaeger.* **54.** 345–356. **1878**

Lesions from 25 cases of bone TB. in swine were examined histologically. They were well demarcated by a connective tissue capsule and were divided into lobules, each lobule containing one or more epithelioid cell groups containing polymorphonuclear leucocytes. The tissue bounding the epithelioid cell groups was granulation tissue. Giant cells were rarely seen and necrotic foci were only present in eight cases.

Every case was examined microscopically and culturally and, apart from some in which results were not obtained or were uncertain, all were of bovine type infection.—J. E.

*AMBROSIONI, P. (1941). Contributo allo studio della tubercolosi nei felini. **[TB. in Felines].**—*Clin. vet., Milano.* **64.** 245–249. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 595]. **1879**

TB. was confirmed in a leopard and a lion at the Zoological Gardens, Rome. Cultural and g. pig inoculation tests established the infection as being of the bovine type. The disease took the chronic form in the lion, but was acute in the leopard which appeared to have become infected through contaminated food received whilst in captivity. The lion was infected before it arrived at the zoo.—N. S. BARRON.

CORPER, H. J., & COHN, M. L. (1942). **The Presence of Relatively Avirulent Tubercle Bacilli.**—*J. Amer. med. Ass.* **120.** 426–431. **1880**

A small number of strains of *Mycobacterium tuberculosis* isolated from the sputum of human cases of chronic open pulmonary TB. were studied with regard to their relative virulence. The quantitative evaluation of their virulence was made by determining the number of days by which g. pigs survived the intravenous injection of 1 mg. of culture. Half of the strains were assessed as being highly virulent in that the animals only survived for 16–19 days. The remainder of the strains were only moderately virulent (25–30 days' survival). It is suggested that over a period of years a gradual diminution of virulence may occur in some cases. The need for caution in assessing the prognostic significance of tubercle bacilli in samples of human sputum is discussed.—J. KEPPIE.

NÈGRE, L., & BRETEY, J. (1941). Vaccination par le BCG au moyen de scarifications cutanées. (Troisième mémoire). **[BCG Vaccination by Skin Scarification. III].**—*Ann. Inst. Pasteur.* **67.** 161–172. [Previous parts not traced]. **1881**

Earlier and more intense allergic reactions can be obtained in g. pigs by (1) increasing the number of scarifications (up to 30), (2) increasing the concentration of the suspension of BCG (up to 100 mg. per ml.), and (3) dressing the scarified area with a non-absorbent dressing (cellophane kept in place with collodion). Allergic reactions have also been observed in rabbits and in calves inoculated by this method.—J. M. R.

*WINKEL, A. J. (1941). **[Johne's Disease in Holland].**—*Tijdschr. Diergeneesk.* **68.** 1011–1025. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 361]. **1882**

Johne's disease is spreading steadily in Holland. 20% of all faecal samples sent for examination from the province of Friesland within the last few years up to and including 1941, contained Johne's bacilli. On some farms nearly a third of the cattle gave positive reactions to johnin, and some stockowners lost up to six cattle each annually. Clinical evidence is considered the most reliable means of diagnosis during life, bacteriological examination being most unsatisfactory. The allergic test is of considerable value, but there are considerable limitations to its specificity.

W. believes a State eradication scheme to be justified, with compulsory slaughter of infected animals, compensation, and an educational campaign for stockowners and calf rearers.—ANN F. RUSSELL.

*HUPBAUER, A., & ZARNIĆ, I. (1940). Beitrag zur Diagnose des Rotzes. **[Diagnosis of Glanders].**—*Vet. Arhiv.* No. 7. 321–329. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 4th. 485. (1940)]. **1883**

Animals [? horses] were infected with cultures of *Pfeifferella mallei*. One received 400 ml. by mouth and 13 others various doses subcutaneously. Serological studies were carried out at intervals. The animal receiving the oral dose remained negative, but the remainder developed agglutinating antibodies within 2–8 days and complement-fixing antibodies within 6–9 days. Allergy did not develop before 17 days.—J. F.

GALTON, M. M., & QUAN, A. L. (1943). **Varieties of *Salmonella* Isolated in Florida during 1942.**—*Amer. J. Hyg.* **38.** 173–177. **1884**

The following species of salmonella were isolated during routine examination of human blood and faeces :– *derby, poona, sendai, typhi-murium, anatum, hartford, san diego, montevideo, give, minnesota, cholerae-suis, litchfield, oranienburg, bonariensis,* and one new type *S. florida* with antigenic structure [I], VI, XIV, XXV : d : I, 7 . . .—I. W. BROCKLEHURST.

HINSHAW, W. R., MCNEIL, E., & TAYLOR, T. J. (1944). **Epidemiology of a Maltose Fermenting Variant of *Salmonella Pullorum*.**—*Poult. Sci.* **23.** 94–100. **1885**

Studies are reported on a group of 146 non-motile, maltose-fermenting strains, antigenically indistinguishable from *S. pullorum*, obtained from 52 outbreaks, 12 in chickens and 40 in turkeys. The epidemiology is similar to that of pullorum disease, except that there is a greater tendency for subacute outbreaks to occur. Investigations showed the cycle of infection to be identical with that due to *S. pullorum* and it is concluded that there is so far little justification for considering the variant to be a new species.—JOHN G. CAMPBELL.

GORDON, R. F., & GARSIDE, J. S. (1944). **Salmonella Infections in Ducks. Observations of the value of the agglutination test in the eradication of infection and investigations on the cycle of infection *via* the Egg.**—*J. comp. Path.* **54.** 61–76. **1886**

Failure to eliminate reactors to *S. typhi-murium* and *S. enteritidis* by the agglutination test is recorded. The antigen consisted originally of two batches, composed of six strains of *S. enteritidis* and six strains of *S. typhi-murium* respectively. Later, similar antigens were used, prepared from strains isolated in the outbreaks studied. Reasons for the failure are given, including non-removal of reactors, ineffective hygiene, fluctuation in titre of the sera of carrier ducks, influence of ovarian activity, and continuous reinfection. In support of this last reason, it was found that the percentage of reactors increased with the age of the ducks.

Details are given of cultural and serological reactions of the organisms isolated, and results of P.M. and bacteriological examinations and of breeding experiments are also shown. The recovery of *S. essen* is recorded. It was impossible to demonstrate transmission *via* the eggs, by cultures made either from eggs or ducklings. —JOHN G. CAMPBELL.

HOHN, J., & HERRMANN, W. (1942). Von Primat des Kulturell-Biochemischen in der Typhus-Paratyphus-Enteritis-Gruppe. **[The Primary Importance of the Cultural-Biochemical Method in the Diagnosis of Salmonella Infection].**—*Zbl. Bakt. I.* (*Orig.*). **148.** 377–387. **1887**

A number of strains of salmonella were examined serologically, culturally, and biochemically. Though information regarding the antigenic structure was valuable the authors reverted to their original view that cultural and biochemical tests—which they describe—are more valuable as a means of identifying and classifying organisms of the colon-typhoid group of intestinal origin.—N. S. BARRON.

LINSERT, H. (1943). Wachstumhemmung des Bact. enteritidis Gärtner (Rostock) durch Malachitgrün. **[Inhibition of Growth of *Salmonella rostock* in Malachite Green Medium].**—*Z. Fleisch- u. Milchhyg.* **54.** 25–26. **1888**

The growth of *S. rostock* is partially inhibited on malachite-green agar plates, and it is necessary to incubate such plates for 48 hours at 37°C. to ensure that colonies of this organism will appear.—E. COTCHIN.

I. BENDIXEN, H. C. (1944). Et Tilfaelde af akut Brucellainfektion i Pars glandularis ductus deferentis (Ampulla ductus deferentis) hos Tyr. **[A Case of Acute Brucella Infection in the Glandular Part of the Deferent Duct in a Bull].**—*Maanedsskr. Dyrlaeger.* **56.** 1–11. **1889**

II. SEIT, B. (1944). Kastningssmitte ved kunstig Inseminering. **[Transmission of Contagious Abortion through Artificial Insemination].**—*Ibid.* 12–37. **1890**

These two papers concern the same outbreak of contagious abortion in herds where numerous cows were inseminated as a routine practice with semen from bulls kept separately on various premises. When abortions began unexpectedly to occur in the previously clean herds investigations were made which finally pointed to infected semen as the origin of infection.

I. Agglutination tests on the blood serum and semen of four bulls and bacteriological tests of the semen demonstrated heavy seminal infection in one bull with a low blood titre (1 : 40). The bull was not again bred and was slaughtered four months later. P.M. examination revealed no abnormality of the genital organs except signs of a previous inflammation of the ampulla of the deferent duct on the left side only. Brucella could not be recovered : in other words the infection had not persisted. The histology is described in detail.

II. This gives the history of the investigation. Late in 1942 positive reactions to the blood test for brucellosis were obtained during routine testing, in herds previously considered as " clean ". On investigation by the Veterinary Directorate it was found that the reacting cows had been inseminated with semen from the Elite Cattle Breeding Institute on Langeland, where four bulls were kept. One bull, the one which had supplied semen for the reacting cows, was found to be infected [see I].

During 1942, 921 cows were inseminated from the bull in question, but infection developed only among some of 49 cows which were inseminated on two days in July, 32 of these cows being in " clean " herds. On

routine testing later in the year, 16 of these cows reacted.

The bulls were by chance blood tested soon after the two significant days in July and the affected bull was not used any more as a semen donor, but it is remarkable that infection of its deferent duct was fleeting and that it was overcome, as evidenced by the negative cultural test [see I]. The histological picture, however, supported the diagnosis.

The question of transmissibility of brucellosis by copulation is reviewed with reference to the literature. Transmission in this way is known to be possible but is generally regarded as unimportant in practice. This record of transmission in course of artificial insemination is a very important observation, which has obvious implications.—J. E.

ONETTO, A. E., & LEYTON, G. (1940). La brucellosis en la provincia de Antofagasta con especial referencia al departamento del Loa. [**Brucellosis in the Province of Antofagasta with special reference to the Department of Loa**].—*Rev. Inst. Bact. Chile.* **7.** 37–41. **1891**

Serum-agglutination tests for brucellosis were positive in 26·2% of 183 goats examined, in 19·1% of 109 sheep, in 34·1% of 41 milch cows, in 58% of 74 slaughter cattle, and in 37·8% of 37 slaughter pigs. Thirty-three of 87 serum samples from human beings in contact with livestock were also positive; *Brucella melitensis* was isolated from three of these cases.

The authors speculate on the incidence of *Br. melitensis* in domestic animals in the area. They carried out qualitative serological tests in sheep with positive results in two animals. [Little satisfactory bacteriological work was carried out.]

FEENEY, R. E., MUELLER, J. H., & MILLER, P. A. (1943). **Growth Requirements of *Clostridium tetani*. II. Factors Exhausted by Growth of the Organism. III. A "Synthetic" Medium.**—*J. Bact.* **46.** 559–562 & 563–571. [See also *V. B.* **13.** 240]. **1892**

II. A continuation of the study to determine the essential food substances and inorganic ions required by *Cl. tetani* for maximum toxin production. Casein hydrolysate medium was used, together with various growth accessories. The utilization and eventual disappearance from the medium of individual substances during the growth of the organism was followed. The constituents necessary for toxin formation were to a certain extent determined. The concentration of iron in the medium was shown to be the most important single factor. For the maximal production of tetanus toxin about 0·05 μg. Fe per ml. is required. Less than this diminishes growth and more than this increases growth but diminishes toxin. The concentration of tryptophane was another critical factor, and its presence was essential. Among the other requirements of *Cl. tetani* were biotin, oleic acid, folic acid, and the amino acids, glutamic acid and histidine.

III. A medium of known composition is described which permits good growth of *Cl. tetani*. A basic liver-extract medium which was by itself incapable of supporting growth was supplemented by various pure substances which were shown to be inducive to good growth. The various amino acids showed the following order of importance. Tryptophane, cystine, tyrosine, leucine, isoleucine, histidine, valine, and arginine were essential for growth. Those strongly stimulatory were threonine, serine, and phenylalanine. Methionine, lysine, and aspartic acid were only slightly stimulatory. Glutamic acid was not essential but it encouraged heavier growth. Other essential substances were oleic acid, biotin, nicotinic acid, uracil, and pyridoxine. Manganese was shown to be necessary for optimal growth. The formula for the synthetic medium is given and the nutritional requirements of other pathogenic clostridia are briefly reviewed. Work on the use of these media for toxin production was not then complete.—J. KEPPIE.

REED, G. B., ORR, J. H., & BROWN, H. J. (1943). **Fibrinolysins from Gas Gangrene Anaerobes.**—*J. Bact.* **46.** 475–480. **1893**

When placed in contact with coagulated plasma from man, g. pigs, sheep, and rabbits, cultures of the following species of clostridia have in general been shown capable of producing *in vitro* fibrinolysis:– *Cl. welchii*, *oedematiens*, *septicum*, *sordellii*, *chauvoei*, *histolyticum*, and *sporogenes*. No fibrinolytic activity has been detected in cultures of *Cl. tetani*, *fallax*, *tertium*, or *aerofoetidum*. The fibrinolytic activity of cultures and filtrates persisted after the preparations had been heated at 100°C. for some time, whereas their ability to hydrolyse gelatin was destroyed by that treatment. Rabbits were immunized with toxins and toxoids of *Cl. septicum* and *Cl. sordellii*. *In vitro* tests failed to detect the development of any anti-fibrinolytic factor in their blood. The clotting of plasma which is a characteristic property of pathogenic staphylococci is not a significant feature of the activity of pathogenic clostridia. Evidence was obtained that muscle infected with the principal gas-gangrene organisms contains fibrinolysins which may play a part in the spread of the infection.—J. KEPPIE.

KESSLER, W. R. (1943). **Studies on Experimental *Bartonella muris* Anemia in the Albino Rat. I. Age and Resistance. II. Latent Infection and Resistance.**—*J. infect. Dis.* **73.** 65–76 & 77–84. **1894**

I. Working with splenectomized albino rats of a bartonella-free strain, K. found that adult animals which received the largest inoculum were the first to show parasites, and were the first to succumb. The interval between the appearance of parasites in the blood and death was constant. Unweaned rats, even if born from splenectomized mothers, became infected but did not die, and the prepatent period was longer than in adults.

It is pointed out that it is practically impossible to produce manifest bartonellosis in adult rats with intact spleens, and that in adults resistance is largely controlled by the spleen. It is suggested that in young rats the macrophage system remaining after splenectomy is more active than in adults.

II. Injection of bartonella-infected blood into adult rats of bartonella-free stock, directly after splenectomy, caused a mortality rate of 100%, whilst in animals infected two weeks prior to splenectomy, the mortality rate was dependent on the size of the inoculum, though a minute amount of blood from a rat with latent infection would kill a splenectomized animal. Removal of the spleen apparently eliminates the mechanism which inhibits the multiplication of the parasite. Since, however, a high proportion of animals suffering from latent infection survive splenectomy, and animals which recover from an acute attack after splenectomy are highly resistant to superinfection, there are reasons to believe that other elements of the reticulo-endothelial system may become activated.—U. F. RICHARDSON.

FORBES, G. B., & GOLIGHER, J. C. (1944). **Necrobacillosis in Man.**—*Lancet.* **246.** 399–401. **1895**

A case is reported of necrobacillosis in a stoker, aged 24 years, with limb injuries due to enemy action. Although surgical treatment and sulphanilamide medication were promptly employed, a wound in one leg failed to heal and the general condition of the patient deteriorated. The leg was amputated but numerous

pyaemic abscesses appeared and death occurred three months after the injury had been sustained. *Fusiformis necrophorus* was grown in anaerobic culture from the abscesses and from the blood before death. No growths appeared in aerobic cultures. Necropsy showed multiple pyaemic abscesses in both lungs and in the subcutaneous tissues of the limbs. Inoculation of material from the abscesses killed a rabbit in 12 days. *Fusiformis necrophorus* was in turn recovered from this animal.—D. D. OGILVIE.

BEVERIDGE, W. I. B. (1943). **Isolation of Pleuro-pneumonia-Like Organisms from the Male Urethra.**—*Med. J. Aust.* Dec. 11th, 479–481. **1896**

Pleuro-pneumonia-like organisms were isolated in four of 24 human cases of non-gonococcal urethritis. The organisms grew luxuriantly in semi-solid agar "V.F." serum medium but were not pathogenic to mice when injected intraperitoneally.—D. F. STEWART.

MCILWAIN, H. (1943). **Nutritional Studies of Bacterial Variation. I. Resistance to Pantoyltaurine in Naturally-Occurring and Experimentally Prepared Strains. II. The Derivation of Drug-Resistant Strains in the Absence of any Inhibitor.**—*Brit. J. exp. Path.* **24.** 203–212 & 212–217. **1897**

I. Strains of *Corynebacterium diphtheriae* and of *Streptococcus haemolyticus* were grown on media containing pantoyltaurine until they developed resistance to this. In the case of *Corynebact. diphtheriae*, the resistant strains grew with β-alanine and were able to synthesize pantothenate. The pantoyltaurine-resistant strains of *Str. haemolyticus* still required pantothenate for growth. The pantoyltaurine-resistant streptococci became sensitive to it when salicylate was added.

II. Pantoyltaurine-resistant strains of *Corynebact. diphtheriae* were obtained by cultivation either in high concentrations of β-alanine without pantothenate or in falling concentrations of pantothenate. Highly sensitive strains were developed by cultivation in high concentrations of pantothenate. Thus resistant and sensitive strains were selected without use of the drugs. The strains retained their characteristic resistance or sensitivity when grown on normal media.—E. BOYLAND.

HUDSON, N. P. (1944). **A Broader Perspective for Bacteriology.**—*Amer. J. trop. Med.* **24.** 1–5. **1898**

H. suggests that bacteriology could profitably be developed on a broader basis than at present. Without minimizing the importance of the study of bacteria under artificial conditions, he proposes that more attention should be paid to the significance of natural conditions and environment. He classifies environment as intimate and remote, the former including the cell and tissue constituents of the surroundings of the parasite, the latter including temperature, altitude, humidity, local customs, living conditions, ectoparasites, and flying vectors of disease.

The elucidation of the problem of the host-parasite-environment complex is therefore suggested as the basis for further bacteriological advancement.—I. W. B.

See also absts. **2059-2061** (cocci), **1932** (streptococci), **2062** (pneumonia), **2063** (bovine pyometritis), **1938, 2064, 2094** (TB.), **2089** (salmonella), **1926** (brucellosis), **2093** (clostridia), **2047** (drug-resistance).

DISEASES CAUSED BY PROTOZOAN PARASITES

LAVIER, G. (1943). Sur l'origine des trypanosomes pathogènes des mammifères. **[Origin of Trypanosomes Pathogenic for Mammals].**—*C. R. Acad. Sci., Paris.* **216.** 824–826. **1899**

L. observes that the group is not morphologically homogeneous and describes three categories :– (1) monomorphic forms where all the individuals are long and possess free flagella (*T. vivax*); (2) monomorphic forms, all the individuals being short with no free flagella (*T. congolense*); (3) dimorphic forms consisting of long and short individuals (*T. brucei, T. gambiense, T. rhodesiense, T. evansi*, and *T. equiperdum*). These three categories are regarded as having different origins. Evidence seems to indicate that *T. vivax* was derived from a primitive non-pathogenic species parasitizing primitive ungulates. *T. congolense* is also derived from a parasite of ungulates. The third category is very homogeneous and must be considered as being of common origin—trypanosomes of large mammals, which became pathogenic and owing to various factors, ecological and otherwise, adopted various methods of transmission, either direct as with *T. equiperdum* or by using intermediate hosts. Where the primary hosts are large gregarious animals living in troops or herds, transmission by insects is best adapted for the maintenance of the parasites.—C. HORTON SMITH.

I. WADDINGTON, F. G. (1944). **Lesser Known Lesions of Diagnostic Value in Bovine Trypanosomiasis.**—*Vet. Rec.* **56.** 2–3. **1900**

II. HORNBY, H. E. (1944). **"Lesser Known Lesions of Diagnostic Value in Bovine Trypanosomiasis". [Correspondence].**—*Ibid.* 117–118. **1901**

I. Two lesions are described, which are considered pathognomonic of chronic trypanosomiasis due to *T. congolense* or *T. vivax*, as it occurs in zebu cattle living in close proximity to tsetse-infested bush in Tanganyika Territory.

Early in the course of the disease, the hair of the tail brush becomes loose and may easily be pulled out. Later, in many cases, a marked dermatitis of the brush region develops; the skin becomes thickened and cracks, and a serous exudate escapes which, as it dries, forms crusts at the bases of the hairs. If the animal recovers, the dermatitis subsides.

The second lesion described is an ulceration of the upper surface of the tongue just anterior to the dorsum, commencing at the transverse groove. Ulceration of the tongue appears to develop early in the disease as an active inflammatory process, but if recovery commences the inflammation round the ulcer subsides, and the ulcer begins to heal.

[No information is given as to whether similar lesions occur in cattle in this area not infected with trypanosomes.]

II. H. agrees that loss of the brush often does occur as a result of trypanosomiasis, and that if brushless animals are seen near a fly belt they may be considered as being, or having been, affected with trypanosomiasis. In his experience, however, the obvious loss of brush hairs occurs in only a minority of cases. He points out that *T. congolense* has not been detected with certainty outside blood vessels, whilst *T. equiperdum* and *T. equinum*, credited with the production of exanthematous lesions, are not confined to that habitat. He does not consider that ulceration of the tongue is a true lesion of trypanosomiasis.—U. F. RICHARDSON.

BECKER, E. R., MANRESA, M., & JOHNSON, E. M. (1943). **Reduction in the Efficiency of Ablastic Action in Trypanosoma lewisi Infection by Withholding Pantothenic Acid from the Host's Diet.**—*Iowa St. Coll. J. Sci.* **17.** 431–441. **1902**

Results from a limited number of rats infected with *T. lewisi*, fed on a diet containing vitamins B_1 and B_6 but deficient in pantothenic acid, showed a heavier

trypanosome infection, and a more prolonged period of trypanosome multiplication, than in rats fed on a diet containing pantothenate. It is suggested that this heavier infection is largely attributable to a decrease in the efficiency of the action of ablastin. It is, however, pointed out that the diet given appeared to cause a relapse to *Bartonella* infection, and that the altered behaviour of the trypanosome, death, and other pathological consequences might have been due to this relapse.—U. F. RICHARDSON.

DENISON, N. (1943). **Experimental Studies on *Trypanosoma cruzi* Infection and Reticulo-Endothelial Blockade in Rats.**—*Amer. J. Hyg.* **38.** 178–184. **1903**

This study was conducted to compare the effect of *T. cruzi* infection in rats with the effect of mechanical blockage of the reticulo-endothelial system by trypan blue. The animals were divided into three groups, infected only, blocked only, and both infected and blocked. The blood picture was a slight leucopenia with moderate lymphocytosis and monocytosis, but there was no statistical difference between the three groups. Serum from animals infected with *T. cruzi* caused lysis of the organisms from culture in a dilution of 1 : 5. When infected animals were blocked as well the time required for lysis was increased, and the titre of the serum was reduced. Serum from animals which had been only blocked produced lysis of cultured *T. cruzi* when used undiluted, but became inactive with dilution.—U. F. RICHARDSON.

MORGAN, B. B., & WHITEHAIR, C. K. (1943). **The pH of Bovine Trichomonad Pyometra Fluid.**—*N. Amer. Vet.* **24.** 729–730 & 732. **1904**

The few references in the literature on the hydrogen-ion concentration of pyometra fluid associated with trichomoniasis in cows indicate that it is generally alkaline to litmus paper.

In this study, 20 uteri with pyometra were examined. All were infected with *Trichomonas foetus*, and bacteria were present in six cases. The mean pH, determined with a Coleman electrometer, was 7·17. Of the 20 samples of fluid examined, 15 were alkaline, four were acid, and one neutral; the acid and neutral fluids were all bacteria-free.—M. L. BINGHAM.

SHUTE, P. G. (1943). **Successful Transmission of Human Malaria with Sporozoites.**—*J. trop. Med. Hyg.* **46.** 57–58. **1905**

A number of workers have failed to bring about infection with sporozoites obtained by rupturing oocysts before the oocysts have reached the salivary glands. These workers have found difficulty in accepting Schaudinn's observations on the penetration of human erythrocytes by sporozoites of *Plasmodium vivax*, obtained by rupture of oocysts and not by dissection from the salivary glands. The present author thinks it possible that, in some species, sporozoites may not be infective until they have reached the salivary glands, but that this does not apply to *P. vivax*, *P. falciparum*, or *P. ovale* and *Anopheles maculipennis*. He describes a simple method by which sporozoites from oocysts can be tested without danger of their becoming mixed with the salivary glands.—C. HORTON SMITH.

JACOBS, H. R. (1943). **Immunization against Malaria. Increased Protection by Vaccination of Ducklings with Saline-Insoluble Residues of Plasmodium Lophurae Mixed with a Bacterial Toxin.**—*Amer. J. trop. Med.* **23.** 597–606. **1906**

Water-insoluble residues of *P. lophurae* evidently harbour antigens which favour the formation of protective antibodies in the duckling. Experiments described indicate that the effective antigens do not stimulate the immune mechanisms adequately for the production of protective antibody. Although antigens are present in plasmodial material, they are either too soluble or only partially antigenic, or there is a combination of the two. The hypothesis that plasmodial material contains a hapten is supported by the fact that a pronounced increase in protective antigenicity is evident when a bacterial toxin is added. Immunity to malaria has not been produced but only an increased protection.—C. HORTON SMITH.

WEINMAN, D. (1943). **Chronic Toxoplasmosis.**—*J. infect. Dis.* **73.** 85–92. **1907**

In man, toxoplasmosis occurs in infants as an acute or semi-acute encephalitis, whilst in adults the conspicuous lesions occur in the abdominal and thoracic viscera. As the infantile form can be acquired congenitally although the parents have appeared healthy, it seems that a chronic form exists which causes few or no symptoms during long periods. In experimental work in mice, it was found that the outcome of infection varied with the strain, the route of inoculation, and the dosage of infected material. Immunity acquired by recovered mice was marked, but might persist for only eight weeks, although virulent organisms might still be present in the body. The mortality in mice which recovered from the initial attack was unexpectedly high, and death might occur as late as 4–11 months after infection.

In chronic toxoplasmosis of mice, the changes are markedly different from those of acute infection. The brain sections contained many toxoplasms disposed in pseudocysts, with little or no inflammation in their vicinity. The parasites could not be detected in lung sections, but their presence could be proved by animal transfer.—U. F. RICHARDSON.

COFFIN, D. L., & STUBBS, E. L. (1944). **The Diagnosis of Canine Leptospirosis.**—*J. Amer. vet. med. Ass.* **104.** 152–157. **1908**

Both *Leptospira canicola* and *L. icterohaemorrhagiae* are implicated in disease of dogs in America. In Philadelphia 85% of canine leptospirosis is due to the former. In the early stages the clinical symptoms are fever (104°–106·5°F.), depression, and an injected orange-red conjunctiva, whilst a peculiar stiffness of the hindquarters often occurs, and acute pharyngitis is common. Second-stage symptoms may take either the haemorrhagic form with precipitous decline in temperature, rapid emaciation, urinous smell from the breath and skin, buccal ulcers, and blood-stained diarrhoea or vomit, or the icteric form with jaundice and the maintenance of relatively good condition. Blood examination reveals a low leucocyte count (18,000–50,000 per cu. mm.), the cells being mostly neutrophiles, with no significant change in the red cells. The urine findings are those of acute kidney degeneration and inflammation.

The condition has to be distinguished from distemper, the Stuttgart uraemic complex, and black-tongue, the character of the mouth ulcers being often a useful guide.

For laboratory diagnosis the agglutination-lysis test is useful, and can be used as a plate test, with concentrated antigen stained with crystal violet, but serological tests are not effective for the first five days, and the sera of healthy dogs may have an agglutination titre as high as that of actively diseased animals. The agglutination reaction must be judged in correlation with the symptoms, but should be employed to confirm the clinical diagnosis.—U. F. RICHARDSON.

See also absts. **2065** (bovine trypanosomiasis), **2095** (bovine coccidiosis), **1975** (canine leptospirosis).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

TOUSSIENG. (1944). Vaccinens Anvendelse i Fremtidens Mund- og Klovesyge-Bekaempelse. **[The Future Use of Vaccine in the Control of Foot and Mouth Disease].**—*Maanedsskr. Dyrlaeger.* **56.** 49–65. **1909**

This is a general discussion on the F. & M. disease problem in Europe. At the last meeting of the *Office Internationale des Epizooties* in 1939, the value of vaccination was recognized and its use in an epizootic defined. It is impossible to prepare in advance large quantities of vaccine, before the type of virus causing the epizootic has been determined, and it is advisable to prepare vaccine from the actual field virus, if the vaccine is to be the best possible immunizing agent. For this reason vaccine-producing agencies have to be organized to produce a large output at very short notice and to remain in comparative idleness in the intervals between outbreaks. There is a need for the installation of vaccine establishments in many of the countries of Europe. Germany has planned about four establishments, located at strategic points around her frontier.

During the last great epizootic in Europe (1937 and later), many virus type modifications were observed at different localities at different times and it was also observed that in tests at Riems indications of type given by g. pigs were not always the same as those given by cattle. Thus the initial 1937 strain was an O variant, but in March 1938 a strain was recovered which in g. pigs appeared to be a C type and in cattle an OC variant, whilst the predominating strain in Germany at that time was a pure O type. In August, a fresh outbreak due to A type virus appeared in north-west Germany and this spread quickly while the O type was still prevalent. In 1939 the disease as a whole regressed. Virus types in existence were mainly O and A, but Oa and Ao variants also occurred, and C virus was also detected. The history of virus types noted in 1940–42 is also given briefly as an instance of the great difficulty in preparing effective vaccine. The shortest period between the discovery of virus type and the supply of vaccine in useful amounts is 6–7 weeks, during which the outbreak may increase greatly, easily getting beyond control.

In Denmark, both A and O types of virus occurred and a bivalent vaccine was produced and issued with success. Experience showed that only 58–80% of cattle which had been infected with one type of virus contracted F. & M. disease when exposed to another type and that 40–70% of cattle which had been infected with two types of virus were susceptible to a third type.

With regard to protective measures which are indicated in Denmark in the event of another epizootic in Europe, T. refers to a general examination of this problem by FOGEDBY and ANDERSEN [unpublished work]. These workers propose mass zonal vaccination of close on one million cattle in a belt extending east and west across Denmark at the latitude of roughly 54·5°–55·5°, and the slaughter of any infected herds north of this zone with additional vaccination of cattle within a radius of 2 km. of slaughtered herds. This plan is discussed in the light of vaccine production in Denmark and it is estimated that over one year's full production would be needed in the country before any vaccine could be supplied elsewhere, as for instance to Sweden. The plan may, however, be greatly aided by recent work on vaccine dosage, it having been found that for revaccination purposes to sustain a good immunity, a dose of 15 ml. is sufficient (half the full initial dose). Revaccination is potentially necessary on two grounds—to reinforce a previously conferred immunity against a single virus type or against two types (bivalent vaccine), or to provide protection against a new virus type or variant.

Another important matter dealt with is international co-operation in control, which is necessary in order to have a warning system about the approach and progress of outbreaks and also to facilitate the supply of vaccine where it is most needed.

A final problem mentioned is the need for research on vaccines for animals other than cattle. The present vaccine for cattle is not effective in swine.—J. E.

WOLLENMAN, O. J., Jr. (1944). **Generalized Vaccinia with Dual Virus Infection. A Case Report.**—*Amer. J. Path.* **20.** 173–177. **1910**

Material from a generalized eruption in a child which followed ordinary vaccination, produced a characteristic vaccinal type of reaction on the cornea of the rabbit, complicated by the appearance of intranuclear inclusions. On passage the dual picture persisted. When transferred to vaccinia-immune rabbits, intranuclear inclusions failed to appear. It is suggested that nuclear response was evoked either by a new virus or by a known virus altered by passage in combination with vaccinia.—R. E. GLOVER.

HARE, R., STAMATIS, D. M., & JACKSON, J. (1943). **Influenza amongst Immunized and Unimmunized Populations in 1943.**—*Canad. J. publ. Hlth.* **34.** 442–452. [Authors' summary copied *verbatim*]. **1911**

1. Outbreaks of an upper respiratory infection [in human beings] closely resembling influenza in various centres in the Dominion of Canada during February and March, 1943, are described.

2. There is serological evidence that about 23 per cent of the cases were due to infection by influenza B virus.

3. No clinical differences between the cases diagnosed as influenza B and the remainder could be detected.

4. The clinical condition of both influenza B cases and the remainder varied from a simple common cold to severe influenza complicated by primary atypical pneumonia.

SHARP, D. G., TAYLOR, A. R., MCLEAN, I. W., Jr., BEARD, D., BEARD, J. W., FELLER, A. E., & DINGLE, J. H. (1944). **Isolation and Characterization of Influenza Virus B (Lee Strain).**—*J. Immunol.* **48.** 129–153. **1912**

A more detailed account of work already reported [see *V. B.* **14.** 193, abst. 1242]. There are numerous micrographs taken with the electron microscope.—J. F.

PARKER, E. R., & MACNEAL, W. J. (1944). **Persistance of Influenza Virus on the Human Hand.**—*J. Lab. clin. Med.* **29.** 121–126. **1913**

Manual transmission of influenza virus, especially by persons handling food, should be regarded as a potential danger, since influenza virus of the Melbourne A strain may remain active on the palm of the human hand for 45 min. in the dry state. The virus may be readily inactivated by ordinary soap.—I. W. B.

BURNET, F. M. (1943). **Human Infection with the Virus of Newcastle Disease of Fowls.**—*Med. J. Aust.* Oct. 16. 313-315. **1914**

A case is reported of infection in a human being with the virus of Newcastle disease of fowls. The source of the infection was the accidental squirting of a large inoculum of highly infectious allantoic fluid from an experimentally infected egg. An acute conjunctivitis developed and persisted for one week, during which

local treatment was applied. The virus was isolated from the discharge from the eye and an antibody response was demonstrated by means of the Hirst technique.—D. F. Stewart.

Stickney, J. M., & Heilman, F. R. (1942). **The Isolation of a Virus in Atypical Pneumonia.**—*Proc. Mayo Clin.* **17.** 369–375. **1915**

A virus of the ornithosis group was isolated from a patient with primary atypical pneumonia who had been in contact with fowls and pigeons. Samples of convalescent sera fixed complement to a high titre in the presence of psittacosis antigen. The virus was pathogenic for mice by the intranasal and intracerebral routes, and was not sensitive to sulphathiazole: in these respects, it seemed to be identical with the virus of meningo-pneumonitis described by Francis & Magill [*V. B.* **13.** 321].—R. E. Glover.

*Bonét-Maury, P., & Levaditi, C. (1942). Evaluation par irradiation de la taille du virus de la poliomyélite (souche Lansing). [**Estimation of the Size of the Poliomyelitis Virus By Irradiation**].—*C. R. Soc. Biol. Paris.* **136.** 481–483. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 159. **1916**

By the use of α-rays the authors estimated that the length of poliomyelitis virus particles was approximately 100 mμ.—John Francis.

Derrick, E. H. (1944). **The Epidemiology of Q Fever.**—*J. Hyg., Camb.* **43.** 357–361. **1917**

An investigation into "Q" fever in Australia has demonstrated that the bandicoot is a reservoir of infection, and *Haemaphysalis humerosa* a vector amongst bandicoots, but that the disease can also be transmitted by *Rhipicephalus sanguineus*, *Ixodes holocyclus*, and *Haemaphysalis bispinosa*, the first two of which occasionally attack human beings and cattle; dogs are also susceptible to infection with "Q" fever.

The outstanding feature of the occupation of human "Q" fever patients has been their association with cattle, and though calves can be infected, the human occupation incidence does not suggest that the disease was contracted by handling meat. *Boophilus annulatus microplus* can be infected, but is a one-host tick. *Haemaphysalis bispinosa* occurs in areas where "Q" fever is common, and may be the vector, but it has also been suggested that man may be infected by inhaling the dried faeces of infected ticks.—U. F. Richardson.

Begg, A. M., Fulton, F., & van den Ende, M. (1944). **Inclusion Bodies in Association with Typhus Rickettsiae.**—*J. Path. Bact.* **56.** 109–113. **1918**

Using thin impression smears of lung, fixed by heat and stained by a modification of Macchiavello's method, the authors detected homogeneous red-staining inclusion bodies in the mononuclear cells in rabbits infected with an endemic typhus strain which had been adapted to mouse lung. When the strain was passaged in series through rabbits, morula bodies and bacillary rickettsia appeared, and as these increased in number, the number of homogeneous inclusions declined. In mice, only morula bodies and bacillary rickettsia occurred when a mouse-adapted strain of virus was used, but homogeneous bodies occurred in adapting a g. pig strain to mice.

Morulae are interpreted as intra-cytoplasmic colonies of rickettsia associated with a certain degree of resistance on the part of the invaded cell. Homogeneous bodies are either the most immature forms of morulae, or they are forms of degeneration; no decision was reached on this point.—U. F. Richardson.

Spizizen, J. (1943). **Biochemical Studies on the Phenomenon of Virus Reproduction. I. Amino Acids and the Multiplication of Bacteriophage. II. Studies on the Influence of Compounds of Metabolic Significance on the Multiplication of Bacteriophage.**—*J. infect. Dis.* **73.** 212–221 & 222–228. **1919**

I. The growth requirements of a bacteriophage (P_1) active on a strain of *Bacterium coli* grown *in vitro* were studied, the growth of both bacteria and phage being estimated. The addition of most of the amino acids increased the multiplication of both organisms and virus, but addition of glycine (5×10^{-3}M), or glycine anhydride ($1{\cdot}4 \times 10^{-3}$M), or hippuric acid stimulated phage reproduction rather than bacterial growth. The reproduction of phage was influenced by the previous history of the bacteria. The effect obtained with glycine was not shown by ammonium acetate, glycollic acid, nor methylamine and could be prevented by aminomethane sulphuric acid ($3{\cdot}6 \times 10^{-3}$M).

II. Increase of the phage in *Bact. coli* in the presence of glycine was inhibited by sulphanilic acid, sulphanilamide, or sulphathiazole. Growth was increased by *p*-aminobenzoic acid which was able to neutralize the sulphanilamide inhibition. Production of phage was stimulated by many products including yeast extract, nucleic acid, glycerophosphoric acid, succinic acid, α-ketoglutaric acid, and iron, manganese or magnesium salts. Phage increase was inhibited by poisons such as cyanide, iodoacetate, arsenite, and dinitrophenol.—E. Boyland.

Gest, H. (1943). **The Effects of Inorganic Salts on the Multiplication of Bacterial Viruses.**—*J. infect. Dis.* **73.** 158–166. **1920**

The plaque count method of bacteriophage assay has permitted quantitative determination of the characteristics of virus growth.

The effects of electrolytes on the growth of a salt-sensitive anti-*Bacterium coli* virus were studied. With rising concentration of monovalent cation salts, the virus plaques on nutrient agar became increasingly turbid. Divalent cation salts diminished the plaque size, and concentrations greater than 0·01M prevented the appearance of any visible plaques. The action of both types of salt is probably due to the development of virus-resistant strains of bacteria which obscure the plaque. It is interesting that there is a tendency for monovalent and divalent salts to antagonize each other.—J. F.

See also abstr. **1925** (smallpox immunity), **2078** (ovine balanoposthitis), **2066** (sulphonamide therapy of lymphogranuloma venereum), **2067** (of lymphocytic choriomeningitis), **1963** (Shope papilloma virus), **2096** (rickettsia).

IMMUNITY

Kabat, E. A. (1943). **Immunochemistry of the Proteins.**—*J. Immunol.* **47.** 513–587. **1921**

The emphasis of this excellent review of the literature of protein chemistry and immunology, written as it is from the viewpoint of the immunochemist, is mainly directed towards recently developed and possible elaborations of the quantitative techniques which are, or will be, available for the elucidation of those problems of infectious disease which are concerned with the preparation of effective immunizing antigens from tissue or bacterial constituents. The article gives a brief description of the quantitative methods of immunochemistry, summarizes information derived from recent publications on protein antigens and antibodies, and

points out how the co-ordination of quantitative immunochemistry and the new refined physico-chemical techniques of protein chemistry may, and should, lead to the acquisition of new, important, and useful information.

The first part of the article surveys information regarding quantitative methods for the estimation of the total antibody content of an antiserum, for the description of precipitin reactions, for the estimation of complement, for determining the homogeneity of protein antigens, for the estimation of antitoxins and equine antibodies of the " antitoxin type ", for obtaining information regarding both natural and artificial reacting precipitin systems, for the purification of antibodies, for studies of plasma- and serum-proteins in relation to immunological changes and under pathological conditions, for investigating tissue proteins in relation to species- and organ-specific antigens, and for the study of enzymes and enzyme precursors related to the induction of antibody formation. The second section of the review constitutes a series of brief and critical reviews of available information regarding bacterial-protein antigens derived from pneumococci, haemolytic streptococci, salmonella, vibrios, anthrax bacilli, meningococci, staphylococci, and acid-fast bacilli. Over 460 references to the relevant literature are cited.

The review constitutes a first-class survey of its subject and a useful indicator of the expanding possibilities of immunological development initiated by the quantitative immuno- and physico-chemical advances of the past 15 years. It should be read by all concerned with the elucidation of immunological problems.

—J. Lochiel McGirr.

Gerber, I. E., & Gross, M. (1944). **The Immunological Specificity of Sulfonamide Protein Conjugates as Demonstrated by Anaphylaxis in Guinea-Pigs and the Shwartzman Phenomenon in Rabbits.**—*J. Immunol.* **48.** 103–109. **1922**

Anaphylactic shock was readily elicited in g. pigs sensitized to sulphonamide azo proteins, following the intravenous introduction of the homologous sulphonamide conjugate, the homologous native protein, or a related sulphonamide hapten conjugated with a heterologous protein.

The same effect was demonstrated in rabbits, by means of the Shwartzman phenomenon. One advantage of this test is that a sensitized animal can be used many times.

Gelatin azo compounds lacked antigenic properties. Sulphanilic acid, sulphanilamide, and sulphacetamide all gave cross-reactions with each other when linked to egg albumin or certain other proteins. Sulphathiazole linked to protein did not give cross-reactions with any of the previous compounds. It is therefore pointed out that a patient sensitive to one sulphonamide is not necessarily sensitive to an unrelated sulphonamide compound.—John Francis.

Allison, V. D. (1943). **The Antigens of Enteric Organisms in Relation to Infection and Immunity.** —*Mon. Bull. Minist. Hlth emerg. publ. Hlth Lab. Serv.* **2.** 88–90. **1923**

This article deals with the interpretation of agglutination reactions in the diagnosis of typhoid and paratyphoid fevers and in the detection of carriers. Difficulties arise from the fact that antibodies develop both after infection and after immunization with T.A.B. vaccine, while variation in the antigenic constitution of the infecting organisms further complicates the interpretation.

The presence of flagella is not essential for virulence and the flagellar agglutinins are regarded as being relatively unimportant as an indication of immunity. The importance of the O antigen in producing immunity is recognized, although it is not generally accepted that the titre of O agglutinins in the serum gives any measure of the immunity. Vi antigen plays an important part in typhoid infection and immunity, although its mode of action in relation to virulence is as yet unknown.

In the detection of carriers, the presence of H agglutinins is of importance only where the individual has not been vaccinated or had an attack of disease. The presence of O agglutinins arouses suspicion provided that immunization has not been carried out within the previous six months. A positive Vi aggln. reaction suggests the carrier state, or recent infection, since the T.A.B. vaccine at present in use gives rise to little or no Vi antibody.—I. W. Brocklehurst.

Shahrokh, B. K. (1943). **Preparation and Antigenic Properties of a Crystalline Labeled Antigen.**—*J. biol. Chem.* **151.** 659–664. **1924**

In view of the present unsatisfactory position of the purification of artificially conjugated proteins for use as labelled antigens in immunological studies, methods for the preparation of iodoalbumins capable of purification by crystallization were investigated. It was found that iodinated horse-serum albumin containing less than 4·4% iodine could be crystallized and the antigenic properties of such artificially conjugated proteins were studied.

Recrystallized horse serum albumin was treated in the cold with iodine in potassium iodide solution, precipitated by ½ saturation with ammonium sulphate with the addition of 10% acetic acid, redissolved in sodium acetate, and allowed to crystallize in the cold after ammonium sulphate and acetic acid had been added in quantities proportional to the anticipated iodine content of the protein. A study of the antigenic properties of several such preparations containing varying amounts of iodine indicated that (a) antisera against horse serum albumin reacted with all crystalline horse serum iodoalbumins, (b) antibodies against crystalline iodoalbumins, with the exception of iodoalbumin containing 4·38% iodine, reacted with albumin, and (c) crystalline iodoalbumins induced the production of antibodies which reacted with horse, egg, and bovine iodoalbumins. S. believes that an iodoalbumin containing 2% iodine would be most suitable for use as a labelled antigen.

—J. Lochiel McGirr.

Horgan, E. S., & Haseeb, M. A. (1944). **Revaccination as a Measure of Immunity to Smallpox.**—*J. Hyg., Camb.* **43.** 337–340. [Authors' summary copied *verbatim*]. **1925**

1. Serological methods for the determination of smallpox immunity are briefly discussed, and it is concluded that they are unlikely to provide a diagnostic method of sufficient accuracy.

2. Experimental work is recorded which shows certain differences in the response of previously vaccinated individuals, revaccinated simultaneously with a standard vaccine lymph and an elementary body suspension (vaccinia) of high potency. The significance of these differences is discussed.

3. The results indicate that although the advantage of the E.B. suspension over vaccine lymph is relatively insignificant, that of two insertions over one is very marked. In revaccination the routine use of one insertion only may result in a certain number of semi-immunes (vaccinoids) being erroneously reported as immunes.

4. It is concluded that if the two insertion technique be practised, persons showing immune reactions

(negatives) may be considered, in all probability, as possessing full immunity to vaccinia-variola virus.

*Breitenstein, K. (1940). Bestehen Beziehungen zwischen der Stärke des Euglobulingehaltes, der Höhe des Albumin-Globulin-Quotienten sowie des Bangtiters bei Rindern. **[The Relationship of the Euglobulin Content of the Blood Serum, the Albumin-Globulin Quotient and the Blood Titre for Brucellosis].** —*Inaug. Diss., Hanover.* [Abst. from abst. in *Schweiz. Arch. Tierheilk.* **85.** 344]. **1926**

The results of investigations involving 85 cattle indicated that the euglobulin content of bovine sera, both normal and pathological, was higher than of horse serum. Variations in the albumin : globulin ratio bore no relationship either to the sublimate test or to blood titres for brucellosis. Since antibody is closely related to euglobulin, a rise in the serum content of the latter is held to be indicative of some degree of immunity. —J. Lochiel McGirr.

Weaver, J. B., & Tyler, M. W. (1943). **The Effect of Sulfonamide Compounds on Antibody Response to Staphylococcus Toxoid.**—*J. Lab. clin. Med.* **28.** 1792–1794. **1927**

White rabbits weighing 5–6 lb. were used. Toxoid was given subcutaneously and the soluble salts of the sulphonamides intramuscularly; both injections were begun at the same time and the experiment lasted nine weeks.

Sodium sulphapyridine, sodium sulphathiazole, and neoprontosil, when given to rabbits in doses corresponding to the average therapeutic dose or higher, had no effect on haemoglobin concentration, leucocyte count, or antibody response to staphylococcus toxoid injections. The antihaemolysin titres became positive as soon, and in some cases sooner, in control rabbits and reached correspondingly high levels. In general, the same type of curve was obtained, the fall in titre occurring at approximately the same time after the last toxoid injection.—John Francis.

Burger, M. (1943). **Microscopic Observation of Collodion Particles as Indicators of Type Specific Pneumococcic Immune Reactions.**—*J. Lab. clin. Med.* **28.** 1138–1139. **1928**

A modification of the Cannon & Marshall collodion-particle technique [see *V. B.* **11.** 380.] wherein the degree of agglutination was microscopically examined, was compared with the so-called "collodion-fixation test" of Goodner [*V. B.* **12.** 282.] and with the ordinary precipitin test, the object being the development of a method for the *in vitro* detection of minute amounts of pneumococcal soluble-specific substances (SSS). The microscopic technique simply consisted of placing one drop of the collodion particle-SSS antigen-antiserum suspension on a slide with alongside it two control drops, one of collodion particles plus antiserum and the other of collodion particles plus antigen. The microscopic technique was found to give positive results with dilutions of the SSS antigen 10–100 times greater than the end points of either of the other methods.—J. Lochiel McGirr.

State, D., & Levine, M. (1943). **Human Plasma and Serum Toxicity.**—*J. Lab. clin. Med.* **28.** 1786–1791. **1929**

The authors observed fairly severe reactions following the transfusion of both plasma and serum. Usually, but not always, these reactions could be correlated with the presence of A or B blood group factors. The skin test was a useful method of detecting sensitivity to plasma. Adrenalin was very effective in alleviating the distress produced by transfusion reactions. —John Francis.

Crowley, N. (1944). **Hyaluronidase Production by Haemolytic Streptococci of Human Origin.**—*J. Path. Bact.* **56.** 27–35. **1930**

376 strains of haemolytic streptococci were investigated for the following points :– (1) the distribution of hyaluronidase activity in relation to serological type and group, (2) the relationship of hyaluronidase activity to capsulation, and (3) the relationship of hyaluronidase activity to the source of the strain. Of 308 strains of group A streptococci, 64 strains, all belonging to only two serological types (types 4 and 22) showed hyaluronidase activity, but it is pointed out that as some of the remaining types were scantily represented it cannot be assumed that only two types of group A can produce hyaluronidase. Thirty-five of 55 group C strains and all of 13 group G strains of a variety of types (some not yet fully identified) showed hyaluronidase activity. The hyaluronidase-producing strains were all non-capsulated, but there were non-capsulated strains which did not show hyaluronidase production. No evidence was obtained that hyaluronidase-producing strains were associated with any particular type of infection, nor do the data suggest that there is any correlation between hyaluronidase production and the virulence of the strains for human beings.—R. Allcroft.

Cahen, R. L., & Granier, M. (1944). **Influence of Morphine on Tissue Permeability and the Spreading Effect of Hyaluronidase.**—*Yale J. Biol. Med.* **16.** 257–260. **1931**

Investigations are reported in which young rats and rabbits were used, showing that the subcutaneous injection of morphine caused a diminution in tissue permeability of the skin as measured by the distribution of India ink, suspended either in saline or in testicular extract (hyaluronidase), after intradermal injection. In rats injected with 10, 25, and 100 mg. morphine per kg. body weight, the reduction of the spreading area was 18·5, 58, and 40% respectively. In the rabbit 15 mg. per kg. morphine caused a 17% decrease in spreading. The spreading effect of the hyaluronidase of testicular extract was reduced by 42, 65, and 61% respectively in the rats injected with 10, 25, and 100 mg. of the drug per kg. body weight, and the reduction was 45% in rabbits receiving 15 mg.—R. Allcroft.

Kass, E. H., & Seastone, C. V. (1944). **The Rôle of the Mucoid Polysaccharide (Hyaluronic Acid) in the Virulence of Group A Hemolytic Streptococci.**—*J. exp. Med.* **79.** 319–330. **1932**

Details are given of a quantitative turbidimetric method for the estimation of hyaluronidase activity based on the ability of the enzyme to decrease the capacity of the polysaccharide to precipitate acidified protein. Comparison of this method with the viscosimetric method of McClean & Hale [*V. B.* **11.** 616.] showed that two turbidity-reducing units are equal to one viscosity-reducing unit.

Experiments to determine the effect of testicular extract on phagocytosis of group A and group C streptococci demonstrated that the removal of the capsule by hyaluronidase greatly increased the rate of phagocytosis of both groups and, since the enzyme did not affect the phagocytosis of sensitized or unsensitized pneumococci, it appears that the effect is specific.

The bactericidal activity of non-immune blood against group A streptococci was increased by addition of hyaluronidase but the activity of immune blood was somewhat inhibited by the enzyme.

It is shown that mice infected with young physiologically active group A streptococci could be protected against the infection by frequent injections with 200 turbidity-reducing units of hyaluronidase; the thera-

peutic injections, administered intraperitoneally, were given every two hours for the first 12 hours, every four hours for the next 36 hours, and every 12 for the last 48 hours. The protective action of the enzyme which is effective against 10–100 M.L.D. is destroyed by heating at 60°C. for one hour. The protection is specific as mice infected with type I pneumococcus and treated with hyaluronidase were not only not protected but died somewhat sooner than untreated controls.

These results indicate that while it is apparent that factors other than hyaluronic acid contribute to the virulence of group A streptococci, hyaluronic acid is nevertheless fundamentally connected with virulence. —R. ALLCROFT.

See also abstr. **2106** (fundamentals of immunology), **1991** (vitamin C and haemolysin production), **1883** (glanders diagnosis), **1881** (BCG vaccination), **1906** (malarial immunization of ducklings).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SNODGRASS, R. E. (1943). **The Feeding Apparatus of Biting and Disease-Carrying Flies : A Wartime Contribution to Medical Entomology.**—*Smithson. misc. Coll.* **104.** No. 1. pp. 51. **1933**

A review, with clear text-figures, summarizing modern knowledge on the feeding organs of biting and disease-carrying Diptera.—J. B. CRAGG.

MANINE, A. (1941). Un cas de myiase oculaire à *Oestrus ovis* Linné dans le Sahara central (Fort-Flatters, Sahara constantinois). **[Ocular Myiasis due to *O. ovis* in Central Sahara].**—*Arch. Inst. Pasteur Algér.* **19.** 287–289. **1934**

PÉDOYA, C. (1941). Un cas de myiase oculaire à *Oestrus ovis* à Beni Ounif (Sud oranais). **[Ocular Myiasis due to *O. ovis* in Southern Oran].**—*Ibid.* 362–363. **1935**

Two cases are recorded of ocular myiasis in man caused by the larvae of *Oestrus ovis*.—J. B. CRAGG.

MILNE, A. (1944). **The Ecology of the Sheep Tick, *Ixodes Ricinus L.* Distribution of the Tick in Relation to Geology, Soil and Vegetation in Northern England.** —*Parasitology.* **35.** 186–196. **1936**

The area considered is that of the four northern counties of England. Only one tick, the so-called sheep tick, *I. ricinus*, was recorded from sheep and cattle on hill grazings in the area, although *I. canisuga* was recorded on sheep dogs and foxes. The tick-infested area is markedly discontinuous and comprises only one-fifth of the hill country. Surface geology has a definite influence through the vegetation on the distribution of ticks, for they are confined to rough grazings which are a direct result of poor drainage and/or poor soil.

Soil samples from the hill regions of 33 tick-infested and 42 uninfested farms showed that tick distribution could not be correlated with any of the following soil features :– phosphate or potash content ; pH ; soil texture ; mechanical analysis, or soil depth.

137 tracts of land varying from 100–20,000 acres and randomly distributed over the tick-infested and tick-free areas were classified according to three vegetational types, *viz*, mainly rough grasses, mainly heather, and mixed. No correlation was found between tick distribution and type of vegetation. A careful survey of one hill on a tick-infested farm showed, however, that the nymphs were more numerous the thicker the vegetation layer. This correlation with vegetation layer (mat) held, irrespective of whether grass or bracken happened to be dominant. The chief controlling factor in tick distribution thus appears to be the physical character of the vegetation layer.—J. B. CRAGG.

CLELAND, J. B. (1942). **Injuries and Diseases in Australia Attributable to Animals (Insects Excepted). Series V : Mammals, Fish, Spiders, Mites and Ticks et cetera. Shell Fish, Sponges, Protozoa.**—*Med. J. Aust.* Oct. 3rd. 313–320. **1937**

From the veterinary point of view the greatest interest lies in references to tick-borne diseases, *viz*, paralysis produced by *Ixodes holocyclus*, the role of *Haemaphysalis humerosa*, *H. bispinosa*, *Rhipicephalus sanguineus*, and *I. holocyclus* in the transmission of "Q" Fever (*Rickettsia burneti* infection) of man, and to pruritis of man caused by the poultry mite, *Dermanyssus gallinae*.—H. MCL. GORDON.

MOMBERG-JØRGENSEN, H. C. (1943). Et Tilfaelde af Demodikose hos Kvaeg. **[Demodicosis in a Heifer].** —*Maanedsskr. Dyrlaeger.* **55.** 109–115. **1938**

During the course of a few months, a two-year-old heifer in a herd of 20 cattle developed numerous nodules over its body, chiefly on the fore-quarters. They were about 1 cm. in diameter, had no opening through to the skin surface, and were covered by the normal growth of hair. Diagnosis was made from an excised nodule which was found to consist of a closed abscess containing thick pus and demodex mites 230μ long and 50μ broad. The condition tended to clear spontaneously during the winter, the nodules shrinking to a very small size. Although the animal did not react to tuberculin, similar cases which did react have been reported [see HEDSTRÖM—*V. B.* **13.** 237].

The literature on demodicosis in cattle is discussed. In the matter of differential diagnosis, demodicosis resembles the "skin lesions" which have been observed n tuberculin-sensitive cattle.—J. E.

KEAST, J. C. (1943). **Dermatitis of Sheep due to the Mite *Psorergates ovis*. Results of Preliminary Dipping Trials.**—*Agric. Gaz. N.S.W.* **54.** 177–179. **1939**

A popular account of the condition is given, and its effects on the fleece are illustrated. The current recorded distribution of the mite includes the Pastures Production Districts of Armidale, Bombala, Goulburn, Jerilderie, Tamworth, Yass, and Young. On individual properties the incidence is usually very low, but as many as 20% of sheep have been found to show effects on a few properties. Promising results are reported from the use of lime-sulphur dip.—H. MCL. GORDON.

FORD, C. M. (1944). **A Non-Parasitic Mite in Rabbits' Fur.**—*Vet. Rec.* **56.** 115. **1940**

The occurrence is recorded of the Trombidiid mite *Cheyletiella parasitivorax* on two rabbits with skin disease. Neither case was clinically typical of mange. The mite is not parasitic, but is predatory on other skin parasites [see also *V. B.* **13.** 21].—J. B. CRAGG.

See also abstr. **1917** (vectors of "Q" fever), **2068**, **2069** (insecticides)

PARASITES IN RELATION TO DISEASE [HELMINTHS]

BUGGE, G. (1943). Zu den Formen des Muskelegels beim Schwein in den Trichinenkompressorien. **[Appearance of the Muscle Fluke of Pigs in the Compressorium].**—*Z. Fleisch- u. Milchhyg.* **54.** 21–24. **1941**

The form of the muscle fluke, *Agamodistomum suis*, in compressorium preparations depends on the details of the method of preparation. Because of the pressure employed in the routine preparation of material in the trichinoscope, the muscle fluke cyst may be ruptured

and the flukes be found free in the surrounding fluid and not in the muscle or adipose tissue. If small pieces of tissue are used and only slight pressure applied, side-to-side movement being avoided, the muscle fluke is seen in the muscle or adipose tissue in its natural form. Even with this latter method of preparation, newly formed cysts would be ruptured and the flukes freed. The cyst of *Trichinella* differs from that of the muscle fluke in being firmer and having a higher internal pressure, and as a result of this retains its typical form in the compressorium even under strong pressure. A comparison is made with the constant form of the *Echinococcus* cyst, due to its internal pressure, whilst the varying shapes of *Cysticercus tenuicollis* and of *Coenurus cerebralis* are due to the incomplete filling of the cysts and their small resistance to external pressure. —T. E. Gibson.

Koropov, V., & Roberman, S. (1935). K voprosu o vliyanii glistnovo faktora na sekretornuyu deyatel'nost' zheludka. (Predvaritel'noe soobshchenie). **[Influence of Cestodes on Gastric Secretion. Preliminary Report].**—*Trud. Ural'sk. vet.-zootekh. Inst.* No. 1. pp. 130–136. **1942**

Observations were made on a dog with an "isolated" stomach and which was infested with *Echinococcus granulosus* (56,800 specimens), *Multiceps multiceps* (35 specimens), *Taenia hydatigena* (15 specimens) and *Dipylidium caninum* (5 specimens). Before expulsion of the worms the gastric secretion of the dog was irregular and did not exceed 7·6 ml. during three hours; the same dog on the seventh day after expelling the worms secreted 43·2 ml. and thereafter its gastric secretion remained on a high level. There was also a considerable increase in the acidity of the gastric secretion. Administration of filtered hydatid fluid to this dog produced intoxication lasting over one hour, and its gastric secretion was diminished for several days. —A. Moldawsky.

Spindler, L. A. (1944). **Further Observations on the Pathogenicity of *Strongyloides ransomi* to Swine.**—*Proc. helminth. Soc. Wash.* **11.** 12–13. **1943**

A sow carrying a light infestation of *Strongyloides ransomi* farrowed a litter of 11 apparently healthy pigs which grew rapidly for three weeks, during which time no parasite eggs or coccidial oocysts were detected in the faeces. Between the third and fifth weeks one piglet after another became diarrhoeic and listless, and the breathing became laboured, these symptoms subsiding after about a week. Examination of the faeces showed the piglets to be infested with *Strongyloides*. The animals failed to grow for about six weeks and then began to gain weight slowly. One of the litter died suddenly at the age of 5½ weeks, and was found to carry *Strongyloides* infestation in the intestine and larval infestation of the myocardium and the skeletal muscles, which were considered to be the cause of death. When the litter was weaned at the age of two months, the sow was transferred to an outdoor pen and died suddenly. She was found to be carrying *Strongyloides* in the intestine, and larvae were recovered from the myocardium. No other parasites were found in the animal, and no other condition was found which might have been responsible for death. The observations confirm the pathogenicity of *S. ransomi* and show that sows harbouring very light infestations may infect their piglets.—T. E. Gibson.

Madsen, H. (1943). Trikinfund hos rotter i Danmark. **[Trichinae in Rats in Denmark].**—*Maanedsskr. Dyrlaeger.* **55.** 61–66. **1944**

Trichinae were found in only one of 241 rats sent for examination from seven localities in Denmark, although 28 muscle press preparations were made from each animal.

The bulk of the paper is devoted to a review of theories on the epidemiology of trichinosis. The older authorities (Leuckart and Zenker), incriminated swine and rats as the main reservoirs. Recently foxes have been shown to be important in this respect. It is believed that trichinosis came to Scandinavia, especially to Norway, in imported pork, but the lack of information as to the extent of trichinosis in various animals in less recent times necessarily leaves the problem unsolved. —J. E.

Foster, A. O. (1944). **Some Instances of Interspecific Copulation among Equine Strongylidae (Nematoda) and their Probable Significance.**—*Proc. helminth. Soc. Wash.* **11.** 17–18. **1945**

During a three years' study of equine parasites involving the examination of well over 100,000 strongylid worms representing 35 species, six instances of interspecific copulation were encountered, *viz*, (1) *Strongylus edentatus* male and *Cylicostephanus minutus* female, (2) *Strongylus vulgaris* male and *Cyathostomum coronatum* female, (3) *Cylicocercus catinatus* male and *Cylicocyclus nassatus* female, (4) *Cylicocercus catinatus* male and *Cylicocercus pateratus* female, (5) *Cylicocyclus nassatus* male and *Cyathostomum labratum* female, and (6) *Cylicocyclus nassatus* and *Cylicocercus catinatus* males and *Cylicocyclus nassatus* female.

F. considers it doubtful whether any of these interspecific matings ever produce hybrid offspring. Genotypic hybrids seem possible if the existence of sterile forms is postulated. The occurrence of phenotypic hybrids, differing structurally from the parents and combining the characters of two or more species, has probably never been observed.—T. E. Gibson.

Fourie, J. M. (1942). **A Note on Acute Verminosis in Cattle in a Semi-Arid Area.**—*J. S. Afr. vet. med. Ass.* **13.** 70–72. **1946**

F. records cases of mass and unusually acute infestations with parasitic worms occurring during October amongst cattle about 18 months old in semi-arid areas of South Africa. Affected animals showed poor condition, weakness, severe anaemia, a very persistent watery diarrhoea, and most pronounced symptoms of large oedematous swellings in the throat region. At P.M. examination of one animal very many *Haemonchus contortus*, a fair number of *Bunostomum phlebotomum*, a large number of *Cooperia pectinata*, and a few *Oesophagostomum radiatum* were seen. Dosing with 40 ml. diluted "tetram" led to marked improvement of the less severely affected cases; animals already very weak were not treated and either died or recovered very slowly. Copper sulphate + nicotine sulphate mixture gave good results in other instances. F. comments on the environment of the animals, noting that little or no rain fell between May and September. He also discusses some of the factors predisposing to acute verminosis; in the districts under observation it is considered that heavy infestations will arise when grazing is inadequate and that such aggravated symptoms as are described will only be seen in young stock.—J. N. Oldham.

Hawkins, P. A., Cole, C. L., Kline, E. E., & Drudge, J. H. (1944). **Studies of Sheep Parasites. I. The Course of Untreated Nematode Infections.**—*Vet. Med.* **39.** 154–161. **1947**

Fifty ewes selected at random from the Michigan Experiment Station flock were brought indoors for the winter in November 1942, and were kept together during the pasture season of 1942 until they returned indoors the following November. During this period the level of parasitic infestation was estimated by periodic faecal

examinations, but no anthelmintic treatment was given to the sheep. Lambs born to these ewes in March 1943 remained housed for nearly two months and were then turned out to pasture. Faecal examinations were made on the lambs at intervals from August to October 1943.

At the beginning of the experiment in November 1942, the egg count of the ewes (400 eggs per gramme) indicated a low level of infestation, insufficient to cause clinically recognizable disease. This low level of infestation was maintained throughout the winter and in a few individuals all worms except *Strongyloides* spp. were eliminated. Following the onset of warmer weather, there was a rapid increase in the egg count, which remained at its peak for about a month and then declined to a residual low level, which was maintained until the experiment terminated. Detailed charts are given to show the fluctuation of egg counts for the various species of worm present.

Studies on the blood picture of the ewes were commenced on May 15th, 1943, when the peak of the worm infestation has passed. There was a decline in the haemoglobin value from the middle of July to the middle of August, although at this time the level of parasitic infestation was extremely low. From that time until the end of the experiment the haemoglobin value gradually rose. The white cell count varied considerably, there being a downward trend, but most of the counts were within the upper limits of the normal range.

The first nematode egg was noted in the faeces of one lamb on April 28th, but no others were seen until June 8th. Although exposed to infestation, the lambs did not become heavily parasitized until weaning time. A peak count was soon reached and then a rapid decline of the egg count followed. The haemoglobin value and the red blood cell count fell and increased again as the egg count rose and fell, and clinical symptoms of helminthiasis appeared when the egg count increased and tended to disappear as it decreased again.—T. E. G.

DINABURG, A. G. (1944). **The Survival of the Infective Larvae of the Common Ruminant Stomach Worm, Haemonchus Contortus, on Outdoor Grass Plots.**—*Amer. J. vet. Res.* **5.** 32–37. **1948**

Sixty concrete boxes 2 ft. sq., the walls of which extended 18 in. below the soil surface and at least 2 in. above this level, were filled to within 6 in. of ground level with clay soil, then to ground level with worm-free loam, and were then sown with grass. At least three months later, at various seasons, a measured amount of suspension containing *H. contortus* larvae in known concentration was placed on the centre of each plot. At varying intervals afterwards the grass was clipped from each plot, or part of a plot, the surface soil was scraped up, and then the first and second inch layers of soil were collected separately, and the larvae were recovered and counted from the grass and from each layer of soil. The maximum temperature and the rainfall were recorded throughout the experiment.

It was found that the percentage of larvae recovered fell to 1% of the number inoculated to the plot after 14–28 days in summer, 27–41 days in winter, 42–56 days in autumn, and 56–70 days in spring. No larvae were recovered from the plots after an exposure of 42 days in summer, 83 days in winter, 96 days in spring, and 316 days in autumn. A lamb which grazed for nine days on two plots on which infective larvae had been exposed for 266 days since the autumn failed to become parasitized with *H. contortus*. Of the larvae recovered 43% were found on the grass, 24·2% on the surface soil, 32% in the first inch of soil, and 0·8% in the second inch of soil—the figure given for the first inch of soil includes exceptionally high recoveries made on two occasions. It is pointed out that these figures for recovered larvae represent minimum estimates, since it is impossible to avoid losses of larvae during the process of recovery. Horizontal migrations of the larvae were only slight. No relationship was shown between duration and degree of survival, and rainfall, but there was a correlation with maximum temperature. —T. E. GIBSON.

ROBERTS, F. H. S. (1942). **Variations in the Vulval Linguiform Process of Haemonchus contortus.**—*Proc. roy. Soc. Qd., 1941.* **53.** 97–100. **1949**

Six distinct types of process are described and drawn. One of these, in which the process is fully developed, is dominant in sheep ; another, in which the process is reduced to a small knob, is dominant in cattle. Cross-infections between cattle and sheep did not influence the type of process, *i.e.* the cattle type was maintained in sheep infested with larvae derived from cattle. It is suggested that this phenomenon may indicate divergence of *H. contortus* into two distinct species.—H. MCL. GORDON.

FURMAN, D. P. (1944). **Effects of Environment Upon the Free-Living Stages of Ostertagia Circumcincta (Stadelmann) Trichostrongylidae : I. Laboratory Experiments.**—*Amer. J. vet. Res.* **5.** 79–86. **1950**

The source of *O. circumcincta* used was a heavily infested lamb, the male worms from this animal being identified as 98% *O. circumcincta* and 2% *O. trifurcata*. The larvae cultured from the female worms thus did not constitute a pure strain of *O. circumcincta*, but the number of *O. trifurcata* present was so small as not to affect significantly the results of the experiments. These larvae were fed to parasite-free lambs one or two months old. Faeces from these lambs were used as a source of eggs and larvae for the tests, which were conducted in constant temperature and constant humidity chambers.

It was found that both embryonated and non-embryonated eggs in shallow water were killed within 1–2 days at a temperature of 45°C. In ice at –6°C. they survived 10–22 days. In water at temperatures above freezing the rate of development increased with rising temperature, 37°C. being above the optimum temperature for survival, although embryonated eggs can survive at this temperature.

Tests for viability of pre-infective and infective larvae, after exposure to different temperatures and humidities, were made by soaking the larvae in water at room temperature and examining them for motility, no sample being discarded in less than 48 hours. Pre-infective larvae were more rapidly killed by freezing and by high temperatures than were eggs. At 5°C., in shallow water, they might survive one or two moults, but 27°C. seemed to be the optimum for their development. Infective larvae proved highly resistant to temperature extremes : if frozen in ice at –6°C. they were killed within approximately two weeks, but at a temperature just above freezing point they survived up to 271 days in shallow water. Mortality increased with rising temperature.

The infective larvae are negatively geotropic either in the presence or absence of light. Larvae migrating in darkness were found to be uniformly scattered, whilst those migrating in a dim light became concentrated towards the areas of maximum illumination. When in water in a horizontal tube the larvae showed no phototropism.

It was found that eggs in faeces buried to a depth of 12 in. in soil are able to complete their development, and that the resulting infective larvae can migrate to the soil surface within a few days. The number of larvae developing and reaching the soil surface is inversely

proportional to the increasing heaviness of the soil. Infective larvae are only able to migrate through moist soil. They can migrate downwards in loose soil to a depth of not more than 2 in. and may be enabled to survive during unfavourable conditions by this mechanism. Lateral migration on the surface of the soil is limited to a radius of about 2 in. Owing to the ease with which they migrate through the soil, ploughing is an inadequate method for ridding a pasture of *O. circumcincta* larvae.—T. E. GIBSON.

LIEBERKIND, I. (1943). Lidt om Rundorme-Aegs Resistens over for ydre Paavirkning. [**Resistance of Nematode Eggs to Extrinsic Influences**].—*Maanedsskr. Dyrlaeger.* **55.** 49–60. **1951**

Numerous tests were made, nearly all with eggs of *Toxocara canis* and a few with those of *T. mystax*. Eggs as collected from faeces were seen to be in different stages of development and at room temperature it required one month for all the eggs to become embryonated.

Embryonation was not hindered by eight days' immersion in 40% formalin, nor by one month in a 10% dilution. One month's immersion in saturated chloramine solution did not hinder embryonation nor affect the larvae. Eight days' immersion in 4% lysol had no adverse effect, but stronger solutions were lethal. Weak or saturated NaCl solutions had no effect. One month's immersion in 10% commercial (38%) HCl had no lethal effect but appeared to reduce larval vitality. The full strength commercial acid was lethal to eggs and larvae in a few hours. Weak or saturated sodium carbonate solutions had no effect. One month's immersion in a 10% solution of the commercial (33%) NaOH had no effect on embryonation nor on larval activity, but the full strength killed eggs quickly. Undiluted commercial sal ammoniac (NH_4Cl) solution had only a moderately adverse effect on embryonation after 14 days' action.

Eggs kept dry for one month remained viable and continued to develop on return of favourable conditions. Rapid chilling to about −40°C. killed the eggs, but it is known that they can survive natural chilling, *e.g.* in faeces, to as much as −20°C. for a time. Eggs containing fully developed larvae were quickly killed by heating in a water bath to 40°C.

In these experiments it was found that resistance decreased as embryonation proceeded and that *T. mystax* was somewhat less resistant than *T. canis*.—J. E.

RANDALL, R. (1944). **Giant Worms in Kidney of Dog.**—*Bull. U.S. Army med. Dep.* No. 72. pp. 9–10. **1952**

A case is recorded of infection with *Dioctophyme renale* in a Canadian sledge dog. The case was diagnosed as distemper, but P.M. examination revealed two of the worms in the right kidney, the tissue of which was completely destroyed, only the capsule remaining. Hypertrophy of the left kidney had taken place. The fish diet of the animal explains the origin of the infection. An account is appended of the distribution, life-history, and pathological significance of the worm.—T. E. G.

See also absts. **2088** (trichinosis inspection in Germany), **2070-2075** (anthelmintics).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

RUNNELLS, R. A., & BENBROOK, E. A. (1944). **Malignant Lymphoid Tumors in Horses.**—*J. Amer. vet. med. Ass.* **104.** 148–150. **1953**

Mention is made of six cases of malignant lymphoma (lymphocytoma) in horses 5–23 years old, which had been seen among a total of 600 tumours of domestic animals examined in 20 years. Four were localized and two had a widespread distribution. The P.M. and histological findings of these latter two cases are given. One is of especial interest, because it closely resembles a case of Hodgkin's disease, *i.e.* widespread lymphoid hyperplasia, the presence of the Dorothy Reed type of giant cell, eosinophilia and fibrosis, and a general hepatic periportal lymphocytic infiltration.

—JOHN G. CAMPBELL.

STRONG, L. C. (1943). **Extensive Breeding as an Adjunct to Mammary Gland Carcinoma Susceptibility in Mice.**—*Proc. Soc. exp. Biol., N.Y.* **53.** 257–258. **1954**

Female mice, the progeny of carcinoma-resistant females and carcinoma-susceptible males, and of the reverse cross, were kept in continual reproductive activity over their entire life span. It was found that this excessive breeding policy favoured the production of spontaneous carcinoma of mammary tissue.

—I. W. BROCKLEHURST.

BONSER, G. M. (1944). **Mammary and Testicular Tumours in Male Mice of Various Strains Following Oestrogen Treatment.**—*J. Path. Bact.* **56.** 15–26. **1955**

Male mice of certain inbred strains were injected weekly with 3 mg. of triphenylethylene. This treatment induced mammary tumours to an extent commensurate with the spontaneous incidence in breeding females. When mice of the R111 strain (a high cancer strain) were foster-nursed by CBA females (low cancer strain) the incidence of mammary tumours was reduced owing to withdrawal of the milk factor. Such mice lived longer and developed interstitial cell tumours of the testis after a year. Testicular tumours occurred in all mice of the Strong A strain, one of the above inbred strains, which survived a year while no such tumours were found in CBA mice. The incidence of testicular tumours was influenced by foster nursing only in so far as withdrawal of this reduces the incidence of mammary tumours and so tends to prolong life.—E. BOYLAND.

BRUNSCHWIG, A. (1943). **Vitamin C and Tumor Growth.**—*Cancer Res.* **3.** 550–553. [Author's summary copied *verbatim*]. **1956**

An excess of vitamin C appears to stimulate mildly the growth of certain transplantable tumors. This stimulatory action cannot be constantly elicited under apparently uniform experimental conditions.

DUNLAP, C. E., AUB, J. C., EVANS, R. D., & HARRIS, R. S. (1944). **Transplantable Osteogenic Sarcomas Induced in Rats by Feeding Radium.**—*Amer. J. Path.* **20.** 1–21. **1957**

Of 13 male rats fed 0·1 mg. radium, nine developed osteogenic sarcomas of vertebrae or pelvic bones in an average time of one year. The tumours were accompanied by widespread necrosis and atypical new bone formation and resembled the tumours produced in human beings following ingestion of radium.—E. B.

SIMPSON, W. L., & CRAMER, W. (1943). **Sebaceous Glands and Experimental Skin Carcinogenesis in Mice.**—*Cancer Res.* **3.** 515–518. [Authors' summary copied *verbatim*]. **1958**

The carcinogenic activity of methylcholanthrene is almost completely suppressed when it is dissolved in melted anhydrous lanolin and the melted solution is applied to the skin of mice 3 times weekly for 14 weeks.

Lanolin represents the sebum of sheep. Unless this sebum differs essentially from that of mice, our results suggest that the sebaceous glands act as a protective mechanism against this chemical carcinogen.

HARRIS, M. (1943). **The Growth of Alien Strain Tumors in Parabiotic Mice.**—*Cancer Res.* **3.** 546–549. [Author's summary copied *verbatim*]. **1959**

1. Parabiotic mice have been used to study the development of immunity from alien strain mouse tumors and the spread of resistance between members of a pair. Mice of the same strain were united and inoculated with alien tumors known to induce an immunity in the hosts.

2. Primary injection of tumor into the left parabionts, 25 days after operation, resulted in a rapid proliferation of the implanted fragments. The eventual size of these tumors did not differ from that attained in single control mice of the same strain.

3. Inoculation of the same tumor 10 days later into the opposite parabionts was not followed by any perceptible growth of the implanted cells. Such fragments were not vascularized by the hosts, which appeared to be immune from the tumor.

4. It is suggested that inoculation of an immunizing tumor into one parabiont leads to simultaneous development of resistance in both animals. The mechanism of this process may involve chemical factors that are given off by the implanted tumor cells and circulate through the connected vascular systems.

TAYLOR, A., HUNGATE, R. E., & TAYLOR, D. R. (1943). **Yolk Sac Cultivation of Tumors.**—*Cancer Res.* **3.** 537–541. [Authors' summary copied *verbatim*]. **1960**

A method is described whereby tumors from the mouse and rat can be cultivated in the yolk sac of the developing chick embryo.

TAYLOR, D. R., MCAFEE, M., & TAYLOR, A. (1943). **The Effect of Yolk Sac-Cultivated Tumors on the Hemoglobin Level in the Embryonic Chick.**—*Cancer Res.* **3.** 542–545. [Authors' summary copied *verbatim*]. **1961**

Mammary carcinomas of mice were grown in the yolk sacs of 51 embryonic white Leghorn chicks. The hemoglobin level of these chicks was found to be considerably depressed by the 17th to 18th day of incubation (as much as 70 per cent in individual cases). The severity of the depressant action was in a direct and fairly constant relation to the size of the tumor. A diminution in the size of the chick and possible damage to the liver were the only other apparent results of the procedure.

*AULER, H., & BANZER, G. (1942). Untersuchungen über die Rolle der Porphyrine bei geschwulstkranken Menschen und Tieren. **[The Role of Porphyrin in Cancer in Man and Animals].**—*Z. Krebsforsch.* **53.** 65–68. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*), **143.** 400]. **1962**

In most cases of cancer there is an increase in the excretion of porphyrins in the urine. Many superficial tumours fluoresce when exposed to ultra-violet light *in situ*. The necrotic parts of internal tumours also fluoresce. The fluorescence is due to the presence of porphyrins and is increased by the injection of haematoporphyrin. Injection of porphyrin into the tumours causes liquefaction which is increased by exposure to ultra-violet light.—E. BOYLAND.

MARKHAM, R., SMITH, K. M., & LEA, D. (1944). **Note on the Size of the Shope Rabbit Papilloma Virus.**—*Parasitology*. **35.** 178–179. **1963**

Using formulae which have previously proved satisfactory for other viruses, the authors determined the size, shape, and degree of hydration of the Shope papilloma virus.

Electron microscopy shows the virus to be spherical and gives a figure of $44{\cdot}6 \pm 1{\cdot}6$ mμ for the diameter of the unhydrated particle, whilst the calculated value is $48{\cdot}3 \pm 0{\cdot}3$ mμ. The degree of hydration can be determined by the viscosity measurements in the case of a spherical virus. Thus Einstein's viscosity equation gives 1·73 g. water per gramme unhydrated virus. This agrees with the figure $1{\cdot}88 \pm 0{\cdot}11$ arrived at from sedimentation and diffusion data. In solution, the virus hydrates and its diameter increases to 73 mμ whilst its molecular weight is 130 million.—JOHN G. CAMPBELL.

See also absts. **1964** (bovine neoplasia in Ireland), **2075** (fowl leucosis complex), **2076**, **2077** (chemical and hormonal inhibition of neoplasms).

DISEASES, GENERAL

MORRIS, J. M. (1944). **Emergency Slaughter and Malignant Neoplasia (Bovine).**—*Vet. Rec.* **56.** 119–121. Discussion pp. 121–123. **1964**

Reference is made to the various conditions in which an emergency slaughter animal may enter an abattoir. It may arrive :– dead and either bled or unbled, dead and paunched, alive (preferable), or as two sides, four quarters, or a carcass. The procedure for examination is discussed. An account is also given of the number of cases of bovine neoplasia encountered in the west of Ireland as compared with other Irish counties. The incidence in the west is high (47·3%), particularly in County Mayo, where the soil is poor in potassium and phosphorus. In the discussion of the papers reference was made to the tainting of carcasses with drugs such as iodoform and camphor, to parasitic infestation, and to ragwort poisoning.

—JOHN G. CAMPBELL.

VAIL, E. L., & MCKENNY, F. D. (1943). **Diseases of Domestic Rabbits.**—*Conserv. Bull. U.S. Fish Wildl. Serv.* No. 31. pp. 28. **1965**

This is a useful publication written by two veterinarians for use by rabbit breeders. The information it contains is intended for North American readers, although much of it is equally applicable to British rabbitries. The following conditions are discussed :– pasteurellosis, myxomatosis (which is still spreading from the west coast of California inland, and which is termed mosquito disease by some breeders), pneumonia (which is considered as an entity), spirochaetosis, miscellaneous vent infections, tularaemia (note only), eye infections of young rabbits, mucoid enteritis or bloat, sore hocks, mastitis or caked udder, indigestion or slobbers, diarrhoea, wry neck, urine burn, wet dewlaps, plant poisoning, and various parasitic infestations.

In some cases the information is scanty or disappointing and the treatment of a rather elementary nature.—ALASTAIR N. WORDEN.

SIMPSON, R. E. H. (1943). **Criteria of Life and Death in Human Pus Cells.**—*Brit. J. exp. Path.* **24.** 218–223. **1966**

The criteria which have been used by various workers to differentiate living and dead granular leucocytes have usually been one or more of the following, *viz*, phagocytosis, pseudopodial activity, and motility of the cytoplasmic granules. The first two are inadequate since their absence does not of necessity indicate cell death : the significance of granule motility has not been

established with certainty, some workers claiming that it occurs only in living cells whilst others state that it is seen only in dead or moribund cells.

S. has made observations over a period of six years on the development and disintegration of human pus cells. Observation of living and dead cells in fresh unstained material was supplemented by a study of stained material so as to correlate stained appearances with the phases of the living cell.

Granule motility was seen to occur in living cells; at times the granules became motionless and later resumed their motility. It is probable that granule motility does not occur in dead cells.

Living pus cells may exhibit three types of change :– (1) reversible changes or *activities, e.g.* amoeboid pseudopodial activity, filopodial activity, ejection of pus-cell corpuscles, filiform elongation of the whole cell; (2) irreversible changes representing *maturation*; increase in cytoplasm and number of granules, decrease in size of nucleus and subsequent lobulation; cells in various stages of maturation may show any of the *activities*, but the maturation process is irreversible; (3) irreversible changes representing *degeneration*; no *activities* are shown and the change is always followed by disintegration.

Addition of 1% methylene blue to fresh pus shows three types of pus cell :– (1) Cells which show intense nuclear staining and cytoplasmic staining of the same intensity as the stain solution. These are cells with non-motile granules and shrunken nuclei and are probably dead. (2) Cells with various degrees of nuclear staining and with unstained cytoplasm and granules. These are degeneration forms and show motile granules. (3) Unstained cells. These are considered to be the healthier cells, the methylene blue which enters the cell being reduced to a colourless substance by the intact enzyme system. It is suggested that the point at which methylene blue first begins to colour the cytoplasm may indicate the moment of death. The nucleus may become stained at an earlier stage, possibly indicating that it does not possess a reducing system.—E. G. White.

Rubert, B. (1943). Ulcus pepticum beim Kalbe. **[Peptic Ulcers in Calves].**—*Z. Fleisch- u. Milchhyg.* **54.** 24–25. **1967**

In over 30 years of meat inspection at Riga abattoir, R. has seen one case only of perforation of the abomasal wall by an ulcer in a calf. Since ulcers of the stomach of calves appear to result from too early feeding on too coarse food, R. proposes that, as calving in the springtime to ensure that the first grass eaten is tender is not an economical method of prevention of such ulcers, an attempt should be made to provide tender hay for the young stock, leaving coarser hay for older stock.—E. C.

Himsworth, H. P., & Glynn, L. E. (1944). **Toxipathic and Trophopathic Hepatitis.**—*Lancet.* **246.** 457–461. **1968**

This review attempts to correlate experimental hepatitis in rats with naturally occurring human hepatitis. It is stated that in rats, two forms of experimental hepatitis, designated "toxipathic" and "trophopathic," may be induced. The toxipathic variety, *i.e.* that form resulting from a variety of chemicals and bacterial toxins, differs clinically from the trophopathic, *i.e.* that form due to deficiency of a nutritive factor (but not necessarily to direct dietary deficiency), in three broad ways. Firstly, the toxipathic form is associated with the actual introduction of an abnormal substance produced outside the liver, whereas there is every indication that the trophopathic form is due to the absence of a substance necessary for normal metabolism. Secondly, there is always a long latent period before rats taking the "offending" diet become affected with the trophopathic form. Thirdly, animals which survive a single attack of toxipathic hepatitis appear to recover completely, whereas complete recovery after a single attack of trophopathic hepatitis does not occur. The pathological differences are also marked. In the early stages of toxipathic hepatitis, the necrosis is zonal in type and fairly evenly distributed throughout the lobules. In the trophopathic form, however, the necrosis is massive in type and the distribution tends to be most irregular: scarring of the liver is the inevitable result of even the mildest attack, and in severe cases a nodular hyperplasia results.

In man, the clinical and pathological features of the hepatitis resulting from exposure to certain chemicals closely resemble those of toxipathic hepatitis as described in the rat. Certain other types, *e.g.* infective hepatitis and certain toxaemias of pregnancy, are also similar in their main features to the experimental toxipathic form. It is considered, however, that massive hepatic necrosis and its sequel, nodular hyperplasia, may be classified as trophopathic. In some instances, *e.g.* cirrhosis of the liver among poor Punjabis and poor natives of the Rand, a direct dietary deficiency appears to be responsible, but most cases result as complications of preceding illnesses, and may be considered as conditioned deficiencies. Restriction of the intrahepatic circulation, resulting usually from the swelling of damaged liver cells, is considered to be an important predisposing cause of the human trophopathic type, while such factors as pregnancy, vomiting, and anorexia are held to contribute to its development by reducing the amount of protective nutriment available to the liver. Chemical combination of poisonous substances with protein is also suggested as a further method by which the available nutriment (protein) may be reduced.—A. N. Worden.

*Moretti, B. (1941). Apnea espiratoria in sede di respiro aritmico. Studio clinico su di un cavallo enfisematoso. **[Expiratory Apnoea in Arhythmic Respiration—Study in a Broken-Winded Horse].**—*Nuova Vet.* **19.** 219–227. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 584]. **1969**

Examination was made of an 11-year-old badly broken-winded horse in moderate condition. Respirations were only 3–5 per min., with forced costo-abdominal action and exaggerated inspiration. Expiration was dicrotic with a pause between the two expiratory efforts. The heart action was normal, though the pulmonary contractions were exaggerated. During rest, the length of the dyspnoea phase was very uneven. After 15–30 min. trotting, it varied from 4–8 min. A pneumogram showed that the apnoea occurred in the middle of the expiratory effort, but tended to disappear after a very deep inspiration. At the same time, there was marked arhythmia. The erythrocyte count was generally normal, though Hb was raised and the akaline reserve doubled. These changes were attributed to an akalosis, the CO_2, however, accumulating during apnoea, and the respiratory centre being again stimulated.

With the return of the Hb index to normal, breathing became less restrained and apnoea improved. With a still further fall in Hb, acidosis developed and inspiration became deeper. Observations on this animal were continued for ten days.—N. S. Barron.

Bell, E. T. (1943). **Hyperplasia of the Pulmonary Alveolar Epithelium in Disease.**—*Amer. J. Path.* **19.** 901–911. **1970**

This is mainly a brief review of conditions in man associated with hyperplasia of the pulmonary alveolar epithelium. They include chronic passive congestion,

lipoid pneumonia, chronic interstitial pneumonia, diffuse epithelial hyperplasia of unknown origin, and a few cases of adenoma and carcinoma of the lungs believed to be of alveolar origin. B. describes a case of hyperplasia of the alveolar epithelium: the widespread proliferation of the alveolar epithelium is considered very similar to that occurring in jaagsiekte in sheep. There are a number of excellent photomicrographs which serve to show a useful comparison with jaagsiekte.
—E. G. WHITE.

GEEVER, E. F., NEUBUERGER, K. T., & DAVIS, C. L. (1943). **The Pulmonary Alveolar Lining under Various Pathologic Conditions in Man and Animals.**—*Amer. J. Path.* **19.** 913–937. **1971**

The authors studied a variety of conditions in man in which proliferative changes occur in the alveolar epithelium. Most of the conditions referred to are illustrated by the authors' own cases, together with brief reference to the literature. The various conditions include bacterial pneumonia (cases of lobar or bronchopneumonia complicated by chronic passive congestion or delayed resolution), pneumonia due to viruses (measles, chicken pox, influenza, whooping cough), lipoid pneumonia, phosgene poisoning, irradiation therapy, TB., syphilis, "alveolar cell tumour" (five new cases recorded), silicosis, chronic passive congestion, chronic atelectasis, chronic pleurisy, and lung abscesses.

Alveolar proliferation was described in sheep pox as early as 1903 (BOSC, BORREL) and has recently been recorded in pneumonia in calves. The authors examined 25 cases of acute pneumonia in animals (pig, lamb, fox, goat, cat, horse, cow, tiger, turkey) due to a variety of aetiological agents. Although swelling of septal cells was sometimes seen in the early stages of the disease, true alveolar proliferation with formation of an epithelial lining was rare.

The changes occurring in chronic progressive pneumonia of sheep (similar to jaagsiekte) are briefly described and illustrated. The description is based on examination of 20 cases. Alveolar proliferation was also seen in chronic pneumonia and granulomas in other species, *viz*, three cattle, two goats, one pig. No example of alveolar cell tumour was found in sheep or cattle, in spite of careful search, but neoplasms which appear to be of this type have been described in mice, both naturally occurring and following the application subcutaneously of methylcholanthrene or dibenzanthracene.

The sequence of changes in the septal cells which results in lining of the alveoli is discussed and illustrated diagrammatically. It is suggested that the lining cells may be set free and appear as alveolar phagocytes and even that they may exert a phagocytic activity whilst still attached to the alveolar wall. In old and inactive disease conditions, particularly in pulmonary scars, the lining cells are inert and appear to have lost their phagocytic activity. Alveolar proliferation occurs more frequently in certain sites, particularly just beneath the pleura, near interlobular septa, and around blood vessels and bronchi. It was possible readily to differentiate epithelial cells within alveoli which originated by downgrowth of bronchial epithelium from those arising from alveolar septal cells. The distinction between the two types of cell was especially well marked in chronic progressive pneumonia in sheep. The authors favour the view that the occasional septal cells found in the alveoli in man and most animals and giving rise to the alveolar lining in disease are of mesenchymal origin. The factor causing proliferation of these cells may be a change in circulatory conditions interfering with tissue respiration. It is likely that alveoli lined by a continuous layer of cells are unable to participate in respiration and it is probable that in lung scars they are no longer in contact with the bronchial tree.

The article is illustrated by 16 photomicrographs and there are 72 references.—E. G. WHITE.

*OJEMANN, J. G. (1942). **[Leontiasis ossea].**—*Tijdschr. Diergeneesk.* **69.** 515–519. [Abst. from abst. in *Wien. tierärztl. Mschr.* **30.** 153]. **1972**

O. saw cases of facial deformity in a cow and several dogs which he diagnosed as forms of leontiasis ossea, representing localized lesions of osteitis fibrosa (von Recklinghausen's disease). In the bovine case, there was a cystic swelling of the left maxilla containing sanguineous fluid in a fibrous and bony mass of tissue. The differential diagnosis of the condition is discussed.—E. C.

*OJEMANN, J. G. (1943). **[Osteodystrophia fibrosa].**—*Inaug. Diss., Utrecht.* pp. 175. [Abst. from abst. in *Wien. tierärztl. Mschr.* **30.** 157]. **1973**

O. describes eight cases of osteodystrophy in the dog, associated with progressive nephritis, increased blood calcium, enlargement of the parathyroids, and changes paralleling those in the condition in man known as von Recklinghausen's disease (osteitis fibrosa). He is of the opinion that rickets in the dog is in reality either the juvenile form of osteitis fibrosa or is infantile scurvy (Möller-Barlow's disease).

Nearly 900 references are said to appear in the original thesis which is stated to be a valuable contribution to knowledge of the condition.—E. COTCHIN.

NEWTON, O. M. (1942). Osteitis vertebral dorso lumbar, causa de incapacidad temporal del toro para la reproducción. **[Dorso-Lumbar Vertebral Osteitis Causing Impotence in the Bull].**—*J. agron. vet., Univ. B. Aires, 1941.* pp. 521–545. **1974**

Dorso-lumbar vertebral osteitis occurs almost exclusively in bulls of heavy breeds. The predisposing cause appears to be excessive body weight, particularly in young animals, and the direct cause is violent muscular effort during copulation, causing laceration of psoas muscle fibres and the inferior common vertebral ligament at their points of insertion on the vertebral bodies. The condition results in temporary impotence, lasting 3–6 months, depending on the extent and degree of injury.

After the inflammation has subsided, the bull may be capable of serving again, but if ankylosis is not complete, there is danger of fracture resulting in paraplegia and death.

The vertebrae seen P.M. to be most commonly affected with ankylosis are the 11th and 12th thoracic and the 1st–5th lumbar vertebrae.—I. W. B.

BLOOM, F. (1943). **A Cytological Study of the Tubular Epithelium in Acute and Chronic Canine Bright's Disease with Especial Reference to the Mitochondria.**—*Amer. J. Path.* **19.** 957–975. **1975**

Using his own hospital material, B. studied the changes in the mitochondria in dogs with various types of renal damage, *viz*, acute and chronic nephrosis, interstitial nephritis, suppurative nephritis, and leptospirosis. Supravital staining was not used and the term "mitochondria" in this article is used to describe granular structures demonstrable within the cytoplasm by the four special staining methods employed—Altmann's acid fuchsin and picric acid, Cowdry's acid fuchsin and methyl green, Mallory's phosphotungstic acid haematoxylin and Heidenhain's iron haematoxylin.

The observations were mainly confined to the proximal convoluted tubercle since, as in human Bright's disease, the most marked cytological changes are found in this part of the nephron. The mitochondrial pattern was studied in four normal dogs. The

mitochondria occur as long, parallel filaments, extending from the basement membrane to the supranuclear portion of the cell, except in cells which are rich in fat where the mitochondria are absent or occur as small granules scattered between the fat globules. In degenerating tubule cells, the main feature is fragmentation of the rods to form numerous fine granules, and in more advanced degeneration there appear coarse, deeply staining globules of mitochondrial material with no definite cellular orientation. In necrotic cells the granules were clumped to form large irregular masses. The degree of disorganization of the mitochondrial elements seemed directly proportional to the cell damage as shown by haematoxylin and eosin preparations. In regenerated cells the mitochondria were absent or present only as a few small granules. This was a striking feature of the atypical epithelium, often several cells thick, which lined the tubules in the scarred areas in chronic nephritis in the dog.

The literature dealing with mitochondrial changes in the kidney is briefly reviewed and it is suggested that a detailed study of the cytology of the nephron may throw some light on the degree of function damage in chronic Bright's disease.—E. G. White.

Lindeman, H., & Selvaag, O. (1942). **Some Investigations on the Protective Colloids in Urines and Their Relationship to Other Physico-Chemical Properties of Urines.**—*Acta med. scand.* **112.** 445–454. [In English]. **1976**

The quantity of colloids in urine from various individuals was compared by observing the power of the urine samples (by virtue of their colloid content) to protect colloidal gold from precipitation by salt. The object was to determine whether patients suffering from kidney stones showed any constant difference in colloid content of the urine from normal persons. Though the kidney stone patients appeared to show greater variations in colloid content of the urine throughout the day, there was no constant difference as compared with hospital patients who were normal in this respect.

—Rachel Marshall.

—. (1944). **Endemic Goitre in England. Argument for Preventive Action.**—*Lancet.* **246.** 107–109. **1977**

Clinical rules are suggested for distinguishing "established goitre" from "physiological goitre" which is defined as transitory enlargement of the thyroid glands often associated with adolescence in girls. The former condition, which can usually be traced to a deficiency of iodine in drinking water and food, but which may also be conditioned by lack of availability of iodine, can be shown to occur most frequently in certain districts of England which form a distinct belt running approximately from Cornwall through Somerset and the Cotswolds to Derbyshire and Cumberland and Northumberland. As well as being the cause of unsightly deformity, iodine deficiency may give rise to cretinism, deaf-mutism and idiocy and its prevention by introducing one part of potassium iodide in one hundred thousand parts of all common salt consumed in the country is strongly urged.—Rachel Marshall.

Andrew, W. (1944). **Senile Changes in the Pancreas of Wistar Institute Rats and of Man with Special Regard to the Similarity of Locule and Cavity Formation.**—*Amer. J. Anat.* **74.** 97–127. **1978**

A series of morphological changes was observed in the pancreas of ageing rats, rather similar to those found in senile human beings and occasionally in younger persons. The changes consisted firstly of a proliferation of the epithelium of the interlobular and intercalated ducts, with lumen formation in apparently solid masses of proliferated cells. Next, there was expansion of the lumen of the ducts to form thin-walled cysts which later intercommunicated due to rupture of their walls. Squamous metaplasia of the duct epithelium was also observed, and degenerative changes in the acinar cells appeared to reduce the capacity for exocrine function of the pancreas. The changes bore a resemblance to those produced by vitamin A deficiency.—E. Cotchin.

Clare, N. T., & Stephens, E. H. (1944). **Congenital Porphyria in Pigs.**—*Nature, Lond.* **153.** 252–253. **1979**

Pig bones showing a reddish-brown discoloration were sent in by a meat inspector, and on examination were found to contain uroporphyrin I. When a second case was observed in a pig from the same farm, it was possible to trace the sow which was giving birth to such offspring. The sow was found to pass dark urine which, after acidification, showed absorption bands at 555 and 600 mμ, and which on extraction yielded uroporphyrin I and coproporphyrin I, together with small amounts of the series III isomers. The faeces contained coproporphyrin I and traces of coproporphyrin III. The sow has since been purchased for further study, together with the boar which has sired two of her three litters, all of which have contained affected offspring. The sow is black and does not exhibit photosensitivity.

Cases of congenital porphyrinuria in cattle were reported by Fourie [*V. B.* **9.** 256.], and this appears to be the only other case which has been examined of congenital porphyrinuria in living animals.—A. N. W.

See also abst. **2018** (bone diseases in pigs).

NUTRITIONAL AND METABOLIC DISORDERS

McDonald, I. W. (1942). **The Occurrence of Uncomplicated Cobalt Deficiency of Sheep in South Australia.**—*Aust. vet. J.* **18.** 107–115. **1980**

A description is given of a wasting disease affecting sheep on a property having soil classified locally as "Millicent clay" and consisting of a black, friable clay of variable depth and stoniness overlying limestone. It is suggested that this soil type has a geological origin basically similar to the shell sand soils on which "coast disease" occurs. Experiments indicated that the condition studied was probably an uncomplicated cobalt deficiency. No evidence of associated copper deficiency, as it occurs in coast disease, was observed. Seriously affected adult sheep did not show the characteristic "straight steely" appearance of the wool associated with copper deficiency and nothing resembling enzootic ataxia was observed among the lambs. The condition is believed to occur widely on this soil type in South Australia, but its incidence varies greatly from year to year, exemplifying the importance of incipient states of deficiency which may not be apparent except under special seasonal conditions, when they may be accentuated and result in severe losses.—D. A. Gill.

Blakemore, F., Nicholson, J. A., & Stewart, J. (1937). **Some Effects of a High Manganese Content in the Diet of Animals, with special reference to Lactation Tetany.**—*Vet. Rec.* **49.** 415–422. **1981**

In studies concerning the aetiology of lactation tetany, it was found that the pastures in certain parts of Lincolnshire and other areas where the disorder is prevalent, contained abnormally high amounts of manganese. The blood Mn content of six cows which had been grazing for 20 days on these high Mn pastures

averaged 0·160 mg. Mn per 100 ml. serum as compared with 0·003 mg. Mn % for eight cows grazing on pastures with a much lower Mn content.

Oral administration of manganese chloride to rabbits in sublethal doses produced varying results in the blood magnesium level but compared with the control animals a slight temporary reduction in the blood magnesium level was produced immediately following administration of the manganese. The daily oral administration of 100 ml. of 10% $MnCl_2$ to three sheep and of 200 ml. of 15% $MnCl_2$ to one cow lowered the blood magnesium level for the first few days after dosing in one sheep, but in the other two the fall was not significant until about the fifth day and later; in the cow the blood magnesium level fell slightly the first day after administration and continued to remain at a lower level for about 20 days. It was found, however, that repeated doses of manganese did not depress the blood magnesium level indefinitely.

From the evidence it is suggested that in Lincolnshire, if not elsewhere, the connexion between the abundance of young grass and the fall of the blood magnesium level is due to the presence of large amounts of manganese in the grass.—R. ALLCROFT.

—. (1943). **Vitamins and Hormones. Advances in Research and Applications. Volume I.** [Edited by HARRIS, R. S., & THIMANN, K. V.] pp. xvii + 452. New York: Academic Press Inc. Publishers. [8vo]. **1982**

This book represents the first volume of a projected yearly publication dealing with active research and current advances in the vitamin and hormone field. Each chapter is written by an expert and appears to fulfil the avowed aim of the editors, *viz*, to present a carefully digested and well correlated account of the subject under review and to indicate the most fruitful and useful directions for future research. The format of the book leaves nothing to be desired—style, paper, and print are excellent, the chapter bibliographies are good, and the terminal subject and author indexes are useful and comprehensive.

The ten sections of this first volume are as follows :– "Choline—Chemistry and Significance as a Dietary Factor" by C. H. BEST and C. C. LUCAS deals with the chemical and nutritional aspects of the subject; "The Appraisal of Nutritional States" by N. JOLLIFFE and R. M. MOST is mainly concerned with methods for the recognition of nutritional inadequacy in man; "Physical Methods for the Identification and Assay of Vitamins and Hormones" by J. R. LOOFBOUROW deals with visible and ultra-violet absorption spectrophotometry, colorimetry, fluorescence spectroscopy, and fluorophotometry; "The Chemical and Physiological Relationship between Vitamins and Amino Acids" by H. H. MITCHELL discusses evidence concerning the points of contact of various vitamins with amino acids and their functional derivatives; "The Photoreceptor Function of the Carotenoids and Vitamin A" by G. WALD discusses the concept that the photoreceptor function of the carotenoids affords a means of assessing their general zoological position and of correlating their position in animals with that in plants; "The Significance of the Vitamin Content of Tissues" by R. J. WILLIAMS presents a broad view of the problem of vitamin distribution; "Growth-Factors for Protozoa" by R. P. HALL represents a critical survey of the scanty available information; "The Intermediate Metabolism of the Sex Hormones" by G. PINCUS and W. H. PEARLMAN surveys available biochemical information regarding this difficult, though important subject; "The Hormones of the Adrenal Cortex" by T. REICHSTEIN and C. W. SHOPPEE reviews work on the chemistry of the cortical steroids published in the period 1937–1942.

Appearing as it does at a time when the clinical application of knowledge concerning vitamins and hormones is being cautiously explored—and sometimes incautiously exploited—in both veterinary and medical circles this useful volume should have a widespread and appreciative circle of readers.—J. LOCHIEL MCGIRR.

SANDSTEDT, H. (1943). Om A-avitaminoser hos svin. [**Avitaminosis A in Swine**].—*Skand. VetTidskr.* **33.** 342–356. [In Swedish: English summary]. **1983**

S. gives case histories of avitaminosis A in swine in Sweden. The chief symptoms were bad appetite and posterior muscular weakness or even complete inability to rise. Breeding sows showed irregular oestrus and temporary infertility and in one case piglets were born without eyes.

Clinical improvement and recovery followed the injection of large doses of vitamin A (up to 40,000 units for a full-grown sow) and the feeding of foods rich in this vitamin.

The vitamin A content of the liver of some carcasses sent for diagnosis was estimated spectrophotometrically and the results are given. Most of these cases were piglet or weaner "runts" and dietetic correction had good effects on the survivors of the litters. Some of these cases were probably of mixed vitamin deficiency and showed the waxy degeneration of the liver which, according to HJÄRRE & LILLEENGEN, is a sign of vitamin C deficiency.—J. E.

CREECH, G. T., & SEIBOLD, H. R. (1943). **Histopathology of Anasarcous Lesions Observed in Natural Cases of Vitamin A Deficiency in Cattle.**—*Amer. J. vet. Res.* **4.** 353–359. **1984**

Oedema of the subcutaneous and intermuscular connective tissue is common in cattle with vitamin A deficiency. The present study is based on material received from meat inspectors by the Bureau of Animal Industry. On skinning the beast a sero-gelatinous fluid exudes from the subcutaneous and intermuscular connective tissue and the superficial lymph nodes are swollen and oedematous. The histological changes comprise infiltration of the connective tissue with a fibrinous material containing a varying number of cells —lymphocytes, plasma cells, neutrophiles and eosinophiles, and occasional histiocytes. In the intermuscular connective tissue there are sometimes areas of organization of the exudate, with fibroblast proliferation. The muscle fibres show varying degrees of hydropic degeneration and atrophy, progressing in some areas as far as complete disintegration. Many of the blood vessels in the oedematous areas show hyperplastic changes, involving particularly the intima, and causing almost complete occlusion of some of the smaller arteries. Nerves within the oedematous areas show oedema and atrophy.—E. G. WHITE.

ANDERSEN, A. C., & HART, G. H. (1943). **Histological Changes in the Retina of the Vitamin A Deficient Horse.**—*Amer. J. vet. Res.* **4.** 307–317. **1985**

Using a variety of staining methods, the authors have made a detailed study of the histological changes in the retina of the horse in vitamin A deficiency. One horse with vitamin A deficiency was used and this animal developed night blindness after 502 days on the deficient diet and was killed 152 days later. A control animal was given a diet containing vitamin A and was killed after 635 days. The liver at autopsy contained 1,173 I.U. of vitamin A per g. and that of the A-deficient animal contained none.

The characteristic histological change in the vitamin A deficient animal was vacuolation of the bacillary layer of the retina, confined mainly to the outer segments abutting on the pigment layer. The vacuolation is considered as probably due to accumulation of lipoid material: unfortunately, no material suitable for demonstrating the presence of lipoids was available. The possible significance of these findings in relation to regeneration of visual purple is discussed. It is suggested that the pigment layer receives from the blood the ingredients necessary for formation of rhodopsin and passes them to the outer segments of the rods. In the vitamin A deficient retina the rods are unable to elaborate rhodopsin, and lipoid material derived from the blood accumulates in the intercellular spaces between them. The histological changes are illustrated by some very striking photomicrographs.—E. G. W.

CLAYTON, C. C., & BAUMANN, C. A. (1944). **Vitamin A Storage and Factors that Affect the Liver.**—*J. Nutrit.* **27.** 155–164. **1986**

The retention of vitamin A in the liver of the growing rat was apparently unaffected by dosage with *p*-dimethylaminoazobenzene (a potent carcinogen which gives rise to hepatic tumours in the rat), 3-3′-methylenebis (4-hydroxy-coumarin), vitamin K, or carvone, or by feeding on diets of high or low fat content, or on diets rich or deficient in choline.

In experiments with mice, liver vitamin A retention was likewise unaffected by feeding diets capable of raising and then rapidly depleting the fat content of the liver.—ALASTAIR N. WORDEN.

SARETT, H. P., & PERLZWEIG, W. A. (1943). **The Effect of High Temperature and B-Vitamin Levels of the Diet upon the Metabolism and Body Composition of Rats.**—*J. Nutrit.* **26.** 611–620. **1987**

Small groups of male rats (of average individual initial weight 71 g.) were provided with either "high vitamin" or "low vitamin" diets and maintained at room temperatures of either 91°F. or 75°F. The "high vitamin" diet provided double the quantities of vitamin B_1, riboflavin, nicotinic acid, pantothenic acid, and vitamin B_6 present in the "low vitamin" diet, but otherwise the diets were identical, and at both temperatures the food intakes of the "high vitamin" and "low vitamin" groups were equated.

From experiments lasting just over three weeks, it is concluded that at both levels of vitamin intake the rats at 91°F. gained more weight, and retained more nitrogen, fat, and water than the corresponding controls. The concentration of vitamin B_1, riboflavin, and pantothenic acid was found to be greatest in the "high vitamin" group at 91°F. and lowest in the "low vitamin" group at 75°F. The nicotinic acid content of the tissues did not vary with intake or with temperature.—ALASTAIR N. WORDEN.

I. COTTINGHAM, E., & MILLS, C. A. (1943). **Influence of Environmental Temperature and Vitamin-Deficiency upon Phagocytic Functions.**—*J. Immunol.* **47.** 493–502. **1988**

II. MILLS, C. A., & COTTINGHAM, E. (1943). **Phagocytic Activity as Affected by Protein-Intake in Heat and Cold.**—*Ibid.* 503–504. **1989**

I. From studies involving the feeding of vitamin B_1 and choline deficient diets to mice, of vitamin B_1, riboflavin, pantothenic acid, vitamin B_6 and choline deficient diets to rats, and of a vitamin C deficient diet to g. pigs, it is concluded that vitamin deficiency severe enough to retard growth produces a corresponding reduction in phagocytic activity. Phagocytosis in mice was measured by examining peritoneal smears following the intra-abdominal injection of type I pneumococci. In the case of rats and g. pigs, phagocytosis was estimated *in vitro* with heparinized blood samples to which a standardized bacterial suspension had been added.

It is further stated that maximum phagocytic activity was observed at levels of vitamin intake above those necessary for good growth.

The results are held to accord with those of WOOLEY & SEBRELL [*V. B.* **13.** 103.], and it is suggested that subclinical vitamin deficiencies might be detectable by determinations of phagocytic activity before and after test-period administrations of single vitamins.

II. With the aid of a technique essentially similar to that described in I, it was found that in rats kept at a room temperature of 68°F. phagocytic activity was greater when the diet contained 18% protein than when it contained 6, 12, 24, or 36% protein. At a room temperature of 90–91°F., and at a relative humidity of 60–70%, however, phagocytic activity was found to increase with protein intake from the 6% up to the 36% level.—ALASTAIR N. WORDEN.

WRIGHT, L. D., & WELCH, A. D. (1944). **Folic Acid, Biotin and Pantothenic Acid Deficiency and the Liver Storage of Various Vitamins in Rats Fed Succinylsulfathiazole in Highly Purified Rations.**—*J. Nutrit.* **27.** 55–66. **1990**

The hepatic stores of folic acid and of biotin were much less in rats receiving a synthetic diet stated to be adequate for normal growth than in controls receiving a stock diet. The addition of 2% succinylsulphathiazole to the synthetic diet further depleted the liver stores of folic acid and biotin and resulted also in a marked reduction of pantothenic acid storage and in symptoms of pantothenic acid deficiency. Neither the liver pantothenic acid reserves nor the deficiency symptoms were alleviated by parenteral or oral administration of pantothenic acid, whereas dosage with crystalline biotin plus a folic acid concentrate was fully curative.—A. N. W.

GROSS, H., & HENNIG, G. (1942). Der Einfluss von Vitamin C auf die Hämolysinbildung bei Kaninchen. **[Influence of Vitamin C on Haemolysin Production in Rabbits].**—*Z. ImmunForsch.* **101.** 364–368. **1991**

Rabbits injected intravenously with sheep red blood corpuscles were at the same time given injections of ascorbic acid up to 1·5 g. No influence on haemolysin production was observed, nor was there any numerical or morphological change in the individual blood constituents.—E. M. CRUICKSHANK.

SAMPSON, J., HANAWALT, V. M., & GRAHAM, R. (1943). **Ketosis in Swine.**—*Cornell Vet.* **33.** 355–359. **1992**

A sow exhibited symptoms of listlessness, unsteady gait, anorexia, and constipation 3–4 days after farrowing; temperature was 102·5°F., there was no evidence of mastitis or metritis, and the urine gave a positive reaction to Rothera's test. Blood analysis showed definite ketonaemia (70 mg. % acetone) and hypoglycaemia (61 mg. % glucose). Recovery, with return of blood ketones to a trace and blood sugar to 80 mg. %, slowly followed the twice repeated subcutaneous administration of 250 ml. of 50% glucose solution. No definite statement is made as to the cause of ketosis in the sow, but the possibly common aetiology of the condition in the cow, ewe, and sow is discussed.—A. B. PATERSON.

See also absts. **1977** (iodine deficiency), **1968** (trophopathic hepatitis), **1902** (pantothenate in *Trypanosoma lewisi* infection), **1956** (vitamin C and tumour growth), **2037** (atebrin in choline deficiency).

PHYSIOLOGY AND ANATOMY

HOPPER, T. H. (1944). **Methods of Estimating the Physical and Chemical Composition of Cattle.**—*J. agric. Res.* **68.** 239–268. **1993**

The purpose of this paper is to show that the composition of the entire animal and of the carcass (relative fatness, "finish") can be reliably predicted from the analysis of only a small portion of the carcass. Analytical data on 92 cattle were submitted to statistical study in order to determine the relations in physical and chemical composition which could be used for the prediction of the composition of the empty body, carcass, and edible portion of the carcass from the analysis of a rib cut. The "wholesale rib" and its edible portion, and the 9th–11th rib cut and edible portion were studied as indicators of both physical and chemical composition. The physical composition of the whole and edible portion of the "wholesale" and 9th–11th rib cuts and chemical composition of the whole and edible portion of the "wholesale rib" cut were found to be highly correlated with the physical and chemical compositions respectively of the empty body, carcass, and its edible portion. There was a very high correlation between the percentages of fat (separable adipose tissue) and ether extract (true chemical fat) in the several portions of the animal studied. The dressing percentage was not a reliable indicator of fatness. The percentage of ash in the edible portions may be predicted from the percentage of ether extract with nearly as satisfactory results as may be obtained by analysis. For the physical composition of the carcass the percentage of bone was indicated by the percentage of bone in the 9th–11th rib cut. The percentages of ether extract in the empty body and carcass were indicated by the percentage of ether extract in the 9th–11th rib cut and in the edible portion of the carcass from the percentage of ether extract in the edible portion of the 9th–11th rib cut.
—N. J. SCORGIE.

COURTICE, F. C. (1943). **The Blood Volume of Normal Animals.**—*J. Physiol.* **102.** 290–305. **1994**

C. has estimated the blood volume in normal, healthy unanaesthetized animals, using the dye method in which the blue dye T-1824 was employed. The following species were examined :– 60 rabbits, 29 dogs, 30 goats, and 2 horses. Their mean plasma volumes were 50, 54, 53, and 51 ml. per kg. body weight respectively. Their mean blood volumes were 70, 79, 70, and 72 ml. per kg. body weight. Four greyhounds in training had higher blood volume values due to their higher cell volumes.

It was found from these results that blood volume is proportional to the body weight and not to the surface area.—D. L. HUGHES.

MCCARTHY, E. F. (1943). **A Physiological Factor in Haemoglobinometry.**—*Brit. med. J.* Sept. 18th. 362. **1995**

Measurements of haemoglobin concentration in blood should not be made without regard to the fact that diurnal variations occur. The variations found in 18 normal men had an average range of 7% on the Haldane haemoglobinometer scale.—R. MARSHALL.

LANDSBERG, J. W. (1942). **The Blood Picture of Mature Normal Dogs.**—*Anat. Rec.* **84.** 415–421. **1996**

Using oxalated blood obtained from the jugular veins of 66 mature mongrel dogs (41 ♂ and 25 ♀), L. determined the erythrocyte values and calculated the mean and standard deviations. The mean erythrocyte count was 6·27 million per cu.mm., the haemoglobin concentration (Newcomer colorimeter) 13·9 g. per 100 ml. whole blood, and the volume of packed cells (Wintrobe haematocrit) 44·2 ml. per 100 ml. blood.

The mean corpuscular volume averaged 70·5 cu.μ, the mean corpuscular Hb 21·8 $\mu\mu$g. and the mean corpuscular Hb concentration 32·3%. The mean sedimentation rate (Wintrobe & Landsberg method) at the end of one hour was 3·4 mm. Haemolysis began at a saline concentration of 0·46% and was complete at 0·33%.

Finally, L. found that there is no significant difference in the haematological picture for adult ♂ and adult ♀ dogs, whilst there is a significant difference when the blood picture of adult animals is compared with that of immature animals.—JOHN G. CAMPBELL.

RACHMILEWITZ, M., & ROSIN, A. (1943). **Studies on Bone Marrow in Vitro. I. The Cellular Pattern and Behavior of Explanted Bone Marrow.**—*Amer. J. med. Sci.* **206.** 17–26. **1997**

Bone-marrow fragments from the tibiae of rabbits were explanted into a medium composed of rabbit plasma, 3 drops, Tyrode's solution, 3 drops, and diluted chick-embryo extract, 1 drop. The explant was placed in the medium at the time of coagulation of the plasma so that the marrow fragment remained suspended. The tubes containing the explants were sealed and kept at 37°C. The explants were examined at intervals varying from 24–120 hours of incubation. After 24 hours there was evidence of maturation and proliferation of both erythropoietic and myeloid cells. At the end of 48 hours the leucocytes were concentrated towards the periphery of the explant and in the surrounding plasma. This appears to be due to their tendency to migrate from the centre, where they mature, to the periphery of the explant and into the medium. At 72 hours, proliferation of spindle cells had begun and myeloid and erythroid cells were less numerous. Between 96 and 120 hours the explant consisted largely of proliferating spindle cells—fibrocytes derived from stroma cells—and myeloid elements were scanty. In explanted marrow it appears that the multiplication of primitive blood cells fails to keep pace with maturation and migration and so the content of specific bone-marrow elements becomes reduced from day to day and the reticular elements assume the activities of fibroblasts.—E. G. WHITE.

HAHN, P. F., GRANICK, S., BALE, W. F., & MICHAELIS, L. (1943). **Ferritin. VI. Conversion of Inorganic and Haemoglobin Iron into Ferritin Iron in the Animal Body. Storage Function of Ferritin Iron as shown by Radioactive and Magnetic Measurements.**—*J. biol. Chem.* **150.** 407–412. [For previous parts, see *V. B.* **14.** 29]. **1998**

Ferritin, an iron-protein compound found in the liver, spleen, and bone marrow of mammals, is believed to be a storage compound for iron in the body. This conclusion is based upon the finding that iron of injected ferric ammonium citrate and iron of haemoglobin of circulating blood cells (destroyed by acetyl phenylhydrazine) were both converted to ferritin in the liver, and in the latter case in the spleen, of dogs.
—RACHEL MARSHALL.

DOUGHERTY, T. F. (1944). **Studies on the Cytogenesis of Microglia and their Relation to Cells of the Reticulo-Endothelial System.**—*Amer. J. Anat.* **74.** 61–95. **1999**

Studies on the brains of late foetal, newborn, and adult rats, of which impression smears were made and sections cut, and which were subjected to experimental trauma, showed that microglioblasts were histiocytes derived from the undifferentiated mesenchymal cells

of the pia mater, which were attracted into the brain by some unknown stimulus (possibly a fat, as the invading cells became filled with fat). The microglioblasts were identical morphologically with gitter cells, and were capable of ingesting trypan blue and India ink. The first cells to appear in the reaction to induced trauma of the brain of adult rats were lymphocytes, which became transformed into macrophages; the microglia reacted later, giving rise to compound granular corpuscles indistinguishable from the macrophages formed from the lymphocytes. Microglia were capable of taking up trypan blue or India ink which had passed the blood-brain barrier. On these grounds, microglia were to be classified as reticulo-endothelial system cells. —E. COTCHIN.

WATSON, R. H. (1943). **A Note on Factors Affecting the Course Taken by Liquid into the Stomach in Ruminants.**—*Aust. vet. J.* **19.** 86–88. **2000**

It is concluded that in lambs the act of sucking does not provide any stimulus causing functional activity of the oesophageal groove mechanism. The data are most readily explained by considering functional activity of the oesophageal groove mechanism as a constituent feature of a pattern of behaviour—the " appetite for milk "—which includes eagerness to consume milk, vigorous consumption of it whenever offered, and bunting of the head and wagging of the tail while consuming it. The functional activity of the oesophageal groove mechanism is great when the appetite for milk is great and diminishes as the appetite for milk declines. Functional activity of the mechanism does not appear to form a part of the pattern of behaviour activated by thirst, even in young lambs.—H. MCL. GORDON.

*MOREL, M. (1942). Contribution à l'étude de la physiologie des premiers estomacs des ruminants. **[Physiology of the Fore-Stomachs of Ruminants].**—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 63]. **2001**

M. gives a historical and biographical survey of the physiology of the first gastric organ in ruminants and discusses the mechanism of rumination. This has been the subject of a great deal of experimental work by FOA, and particularly by WESTER and STIGLER, who used radiological methods as well as fistulation.

The investigations described have led to detailed knowledge of the role and mode of action of the rumen, the reticulum and the omasum; the main contribution to the study of regurgitation was the discovery of CHAUVEAU and TOUSSAINT (by a graphical method) that rapid and vigorous contraction of the diaphragm occurs immediately before regurgitation. While, however, these two workers considered regurgitation to be a result of aspiration, caused by consecutive thoracic depression and by the closing of the glottis, it is now evident that this aspiration is only a contributory cause, occurring in conjunction with rapid compression of the rumen and simultaneous contraction of the diaphragm. Foa has given evidence that the suppression of aspiration by the formation of a " thoracic window " does not prevent rumination. By severing the phrenic nerves, Wester showed that contraction of the diaphragm cannot be caused by contraction of the abdominal muscles. From this point of view, the regurgitation of rumination appears to be identical with vomiting.—O. HANDS.

OBERLING, C. (1944). **Further Studies on the Preglomerular Cellular Apparatus.**—*Amer. J. Path.* **20.** 155–171. **2002**

Following an account of the findings of other workers and stressing their variability, O. gives details of a perivascular plexus around the cells forming the preglomerular portion of the afferent arteriole, as seen in impregnations of frozen sections of human kidney using the Gros-Schultze technique. O. considers the apparatus to be a vasomotor one, and discusses its possible relationship with hypertension. The apparatus shows appreciable variation and no relation between its development and hypertension can be discerned. In malignant hypertension, the cells of the apparatus are either degenerate or destroyed, but these lesions are probably the result of hypertension and not its cause. —JOHN G. CAMPBELL.

HOOKER, C. W. (1944). **The Postnatal History and Function of the Interstitial Cells of the Testis of the Bull.**—*Amer. J. Anat.* **74.** 1–37. **2003**

The testes of 30 pure-bred bulls from one month to 15 years of age were examined histologically and tested for their androgen content. Mesenchymal tissue only was present in the intertubular spaces at one month of age; this later differentiated into Leydig interstitial cells and fibroblasts. The nucleus characteristic of Leydig cells was recognizable at four months, and metamorphosis of mesenchymal cells to a granular polyhedral epithelioid Leydig cell was completed by eight months. The cytoplasm became more granular and more abundant up to two years of age, from 2–5 years the cytoplasm became more vacuolated and the Leydig cells increased in number and in size, while from 5–15 years there was an increasing loss of vacuolation and diminution in size. The fibrous tissue increased slowly up to 15 years of age. The androgen content of the testes increased slowly and uniformly up to two years, showed a sharp increase from 2–5 years, and a decrease from 5–15 years. The most direct correlation found was between the extent of vacuolation of the Leydig cells and the androgen content of the testes. The fact that no striking increase of androgen content of the testes or marked change in the Leydig cells occurred at puberty is in keeping with the theory that there is at that time an increased sensitivity of the tissues to androgen.—E. COTCHIN.

MACLEOD, J. (1943). **The Physiology of Mammalian Semen.**—*Ann. Rev. Physiol.* **5.** 399–412. **2004**

This is a review article which is mainly concerned with the chemistry of seminal fluid and the metabolic behaviour of mammalian spermatozoa, since it is in these fields that the most recent advances have been made. Reference is also made to recent work on the cellular constituents of semen and to the chemistry of sperm. A short section deals with the new types of diluting fluids and recent methods which have been developed for prolonging *in vivo* the fertile life of spermatozoa in connexion with artificial insemination in animals. The majority of the papers cited refer to the semen of the human subject, but fundamental work on the metabolism of the spermatozoa of the bull and other animals, as well as on artificial insemination problems, is also quoted. Most of the papers dealing with animal spermatozoa have already been abstracted in the *Vet. Bull.*—N. J. SCORGIE.

—. (1942–43). **International Biological Standards. Some Recent Changes Relating to the International Standards for Certain of the Sex Hormones and for Pituitary (Posterior Lobe).**—*Bull. Hlth Org. L.o.N.* **10.** 77–79. **2005**

—. (1942–43). **Memorandum on the Replacement of the Substance of the International Standard for the Oestrus-Producing-Hormone.**—*Ibid.* 80–82. **2006**

—. (1942–43). **Memorandum on the Replacement of the Substance of the International Standard for Male Hormones: Androsterone.**—*Ibid.* 83–85. **2007**

—. (1942–43). **Memorandum on the Replacement of the Substance of the International Standard for the Progestational Hormone of the Corpus Luteum: Progesterone.**—*Ibid.* 86–88. **2008**

—. (1942–43). **Memorandum on the Replacement of the Substance of the International Standard Preparation for Pituitary Posterior Lobe.**—*Ibid.* 89–93. **2009**

—. (1942–43). **Memorandum on the International Preparation of Desiccated Ox Anterior Pituitary Gland.**—*Ibid.* 94–95. **2010**

—. (1942–43). **Memorandum on the International Standard for the Lactogenic (Crop Gland-Stimulating) Substance of the Anterior Lobe of the Pituitary Gland (Prolactin, Galactin, Mammotrophin).**—*Ibid.* 96. **2011**

As stocks of the original preparations of oestrone, progesterone, androsterone, and pituitary (posterior lobe) powder (which served as international standards) were running out, these have been replaced by other samples in order that their supply should be maintained. The new preparations of oestrone, progesterone, and androsterone are pure chemical substances, like the original standards, and their chemical constants, which have been determined, conform to the original definition of the standard material. Small additions have been made to the sections relating to the conduct of biological tests.

The replacement of the first international standard preparation for pituitary (posterior lobe) has been a more difficult matter, since this is not a pure substance but merely a powder obtained from posterior pituitaries under standard conditions. A new standard was prepared and was found to be some 10–20% more active per unit of weight, than the old standard in respect of its three activities (oxytocic, pressor, antidiuretic). It was, however, decided to retain the same weight (*i.e.* 0·5 mg.) as the unit of activity.

An international preparation of desiccated ox anterior pituitary gland has been established. Data are given on its biological activities in terms of its gonadotropic, thyrotropic, and prolactin actions.

A suitable method for preparing a solution of the international standard of prolactin is given.—J. M. R.

Pincus, G., & Pearlman, W. H. (1943). **The Intermediate Metabolism of the Sex Hormones.**—*Vitamins and Hormones.* **1.** 293–343. New York: Academic Press Inc. **2012**

This article synthesizes information on the present position regarding the intermediary metabolism of the oestrogens, the male sex hormones, and of progesterone, *i.e.* hormones of the C_{18}, C_{19}, and C_{21} steroid groups respectively. The adrenal cortical hormones (C_{21} steroids) are only discussed in so far as these are directly related to the metabolism of the androgens. 244 references are listed.

Section I is introductory and includes a brief dissertation on steroid nomenclature. Section II deals with progesterone metabolism and discusses the relative importance of corpus luteum, placenta, and adrenal glands as sources of progesterone and progestationally active substances, methods for the isolation of products which originate from progesterone, species differences in pregnandiol excretion, and the position and importance of certain pregnane derivatives. Section III is concerned with testosterone and androgen metabolism and discusses published data on the isolation of testosterone, androsterone, and related C_{19} steroids, causes of fallacious results in the study of androgen intermediary metabolism, the possibility of the *in vivo* conversion of the C_{21} steroids to those of the 17-ketosteroid group, and theories of the *in vivo* oxidative scission of ring D of the steroid molecule. Section IV contains a brief summary of information relating to common, features of progesterone and testosterone metabolism while Section V discusses methods for the *in vitro* chemical interconversion of these steroids. Section VI is concerned with oestrogen metabolism; it lists the various oestrogens which have been isolated from animal sources, and discusses possible sites of oestrogen synthesis, chemical reactions of oestrogens *in vivo*, and mechanisms and theories of oestrogen inactivation. Section VII, the last, discusses the origin and interrelationships of the steroidal hormones.—J. L. McGirr.

Bishop, P. M. F., & Folley, S. J. (1944). **Implantation of Testosterone in Cast Pellets.**—*Lancet.* **246.** 434 & 435. **2013**

This is a preliminary account of some results of practical interest which have arisen from studies of absorption rates of cast and compressed pellets of steroid hormones implanted in human beings. The rate of absorption of a cast pellet of testosterone is shown to be proportional at any instant to its surface area. The effective life of cast pellets of testosterone of the dimensions described can thus be estimated.

Preliminary studies indicate that in human subjects cast pellets of oestradiol are initially absorbed almost twice as fast as compressed pellets.—Alfred T. Cowie.

Mixner, J. P., & Turner, C. W. (1943). **The Mammogenic Hormones of the Anterior Pituitary. II. The Lobule-Alveolar Growth Factor.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 378. pp. 62. **2014**

The authors review the various experiments which led Gomez & Turner [see *V. B.* **8.** 256.] to postulate the theory that oestrogens stimulate the anterior pituitary to secrete an increased amount of a mammogenic factor causing mammary duct growth, while oestrogens plus progesterone stimulate the production of a factor which causes mammary lobule-alveolar growth. A method of assay for the mammogenic duct growth factor has already been described [see Lewis & Turner—*V. B.* **10.** 714]. The authors now describe the experiments leading to the development of an assay method for the mammogenic lobule-alveolar growth factor. Mammary alveolar growth responses were obtained in ovariectomized virgin female mice (12–18 g.) when injected with various anterior pituitary preparations for periods ranging from 4–10 days, but correspondence between the dosages of the preparations and the positive mammary responses was very poor. When, however, small amounts of oestrone were used in conjunction with the pituitary preparations, the dosage of the extracts required for assay response was greatly reduced and graded responses were obtained which corresponded to the graded pituitary dosages. Five times the dose of oestrone by itself produced no sign of lobule-alveolar growth. Further experimental work showed that a ten-day assay period was most suitable and that ovariectomy should be performed just before the assay begins. From these experiments an assay technique was formulated.

Progesterone or pregneninolone alone caused lobule-alveolar development, but when combined with oestrone much less of either was required. Oestrone in amounts of 40–133 I.U. was found to synergize best with 1·0 mg. progesterone in stimulating lobule-alveolar growth. It is suggested that the oestrogen acts by producing hyperaemia and increasing the permeability of the vascular system of the mammary gland stroma, thus increasing the nutrients available to the gland and the amount of anterior pituitary mammogen in the intercellular spaces.

Assays of various types of pituitary extracts lead the authors to believe that the mammogenic lobule-

alveolar growth factor is not identical with the lactogenic, thyrotropic, or gonadotropic factors. The question of its possible identity with the duct growth stimulating factor as suggested in a previous paper is not discussed [see TRENTIN *et al.*—*V. B.* **14.** 67].

In addition to progesterone, the following substances (arranged in order of potency) can stimulate lobule-alveolar growth :– pregneninolone, desoxycorticosterone acetate, dehydroandrosterone, diethylstilboestrol, acetoxy-pregnenolone, and methyl testosterone.

Secretion of mammogen by the anterior pituitary following treatment with progesterone and oestrone was inhibited by high environmental temperature, but the ability of the mammary gland to respond to the lobule-alveolar growth factor was in no way affected.

Thyroxine enhanced the effect of progesterone, and conversely thyroidectomy greatly decreased the effect of progesterone and pituitary extracts.

The response of virgin female goats to diethylstilboestrol both as regards mammary growth and lactation was variable. In cases where considerable lobule-alveolar development was secured, the histological picture was not typical of that of normal lactating glands but when progesterone was given in addition to the oestrogen, a histological picture characteristic of normal lactating glands was obtained.—A. T. COWIE.

FOLLEY, S. J. (1944). **Recent Advances in Lactational Endocrinology as Applied to Farm Animals.**—*Vet. Rec.* **56.** 9–11. **2015**

The experimental studies on the control of milk secretion by the anterior pituitary and on initiation of lactation in goats and cows by the use of anterior pituitary extracts are reviewed and discussed. FOLLEY & YOUNG [*V. B.* **9.** 737.] have shown that repeated injections of anterior pituitary extracts into cows can produce a considerable increase in milk yield and a 50% increase in daily milk-fat production ; in later unpublished studies, these workers found that the method of preparing galactopoietic anterior pituitary extracts could be simplified without loss of potency. As the treatment necessitates frequent injections and the supply of material is very limited, the practical use of anterior pituitary hormones to increase milk yield is at present not feasible.

The various experiments to investigate the role played by oestrogens in lactation are briefly reviewed and mention is made of hitherto unpublished work on the hormonal induction of lactation in maiden heifers and dry cows by the subcutaneous implantation of tablets of synthetic oestrogens.

The relationship between the thyroid and milk secretion and the experimental studies leading to the production of iodinated proteins are next reviewed. The galactopoietic effect of iodoproteins has now been extensively studied [see BLAXTER—*V. B.* **14.** 170.] and it seems probable that iodinated proteins will soon be used in practice for temporarily increasing the milk yield of cows in declining lactation when it is desirable to do so.—ALFRED T. COWIE.

BELL, G. H., & CUTHBERTSON, D. P. (1943). **The Effect of Various Hormones on the Chemical and Physical Properties of Bone.**—*J. Endocrinol.* **3.** 302–309. **2016**

Experiments in which quality of bone was observed in rats treated with various hormones were designed in an attempt to explain the occurrence of bone deformities in endocrine diseases. The results provided no explanation, since injection of anterior pituitary extract, oestradiol dipropionate, or parathyroid hormone, though it increased the size and corresponding strength of the femora of the rats, did not affect the quality of the bone as regards breaking and twisting strength. Desiccated thyroid, given by the mouth, caused reduction in size and corresponding strength of the bones, but again no alteration in their quality.—RACHEL MARSHALL.

REICHSTEIN, T., & SHOPPEE, C. W. (1943). **The Hormones of the Adrenal Cortex.**—*Vitamins and Hormones.* **1.** 345–413. New York : Academic Press Inc. **2017**

This comprehensive review (referenced to 207 publications) deals with the chemistry of the steroids of the adrenal cortex and surveys work published during the period 1937–42. Section I is introductory and discusses basic biological facts and assay methods ; Section II summarizes information on methods of isolation and nomenclature and formulae, and lists and describes 28 compounds isolated from the adrenal cortex ; Section III discusses the methods used for the investigation of the constitution, configuration, and reciprocal interconversions of these compounds ; Section IV deals with the partial synthesis of the natural and related steroids ; Section V is concerned with the highly active amorphous fractions isolated from the gland, and Section VI deals with the relationship between constitution and biological activity.—J. L. MCGIRR.

*BRUNAUD, M. (1942). Contribution à l'étude des parathyroïdes du porc. Fonction parathyroïdienne. Déductions pathologiques. **[The Parathyroid Glands of the Pig and their Functions : Relationship to Disease].**—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 61]. **2018**

A study of the parathyroids, from the anatomical, histological, embryological, physiological, and pathological standpoints, in mammals and domestic birds, with special reference to the pig. In pigs, the organs possess some interesting peculiarities. In embryos, the parathyroid glands are normally formed at the third and fourth bronchial spaces, but in the pig, those normally formed at the fourth space are missing, and those normally formed at the third are situated at the head of the thymus in the young pig and in a conjugated mass close to the branching of the carotids in the adult pig.

Assuming that the parathyroids control phosphorus and calcium metabolism, B. indicates the possible action of parathyroid failure in the pathogenesis of certain diseases, *e.g.*, sclerodermatitis, tetany, eclampsia, rickets, osteomalacia, and osteofibrosis. Sclerodermatitis is very common in old pigs and tetany in young pigs ; the bone diseases are widespread among pigs of all ages. The deciding factor of these bone diseases has hitherto been considered to be solely alimentary. B. now puts forward the hypothesis that the parathyroid glands play an important part in the pathogenesis of such lesions, and suggests a plan of experiments to test this theory.—O. HANDS.

See also absts. **2108** (physiology of domestic animals), **2097-2100** (haemoglobinometry), **1926** (bovine serum euglobulin and albumin-globulin ratio), **2107** (lymphatic system), **1942** (cestodes and gastric secretion), **2038** (hormone therapy), **2039** (antibacterial action of hormones), **1982** (vitamins and hormones), **1955** (oestrogens and tumours).

POISONS AND POISONING

NEWTON, L. G. (1941). **Barium Carbonate Poisoning in Fowls.**—*Aust. vet. J.* **17.** 232–233. **2019**

Losses in poultry from ingestion of barium carbonate are recorded. Chief symptoms were darkening of the comb, distressed appearance, and incoordination of gait. Chief lesions seen on P.M. examination were

congestion of the alimentary tract and liver, and shedding of the lining membranes of the crop and stomach. Tests revealed that the dose toxic to poultry was 6–10 grains for birds weighing about 1,600 g.—B. J.

Dougherty, R. W., Wong, R., & Christensen, B. E. (1943). **Studies of Hydrogen-Sulfide Poisoning.**—*Amer. J. vet. Res.* **4.** 254–256. **2020**

The authors found that the concentrations of sulphaemoglobin in the blood of animals dying from H_2S poisoning were much less than those of animals in which the concentrations of sulphaemoglobin had been elevated experimentally to much higher levels, with survival. In H_2S-intoxicated animals the CO_2 content of the blood is decreased. CO_2 given intravenously and a mixture of O_2 (90%) and CO_2 (10%) given through an inhalation mask increased the tolerance of experimental animals for H_2S, but did not abolish its toxicity. Artificial respiration applied to intoxicated animals prolonged life but did not prevent death.

It is probable that in H_2S poisoning the carbonic anhydrase of the blood and tissues is inactivated; this would explain the reduced CO_2 content of the blood and the benefit derived on administering CO_2 to intoxicated animals.—G. D. S.

Timson, S. D. (1943). **Prussic Acid Content of the Giant Star Grasses** (*Cynodon plectostachyum*) **and of Kavirondo Sorghum.**—*Rhod. agric. J.* **40.** 371–373. **2021**

This paper gives a short account of the dangers which accompany the feeding to livestock of giant star grass because of its HCN content and a résumé is also given of the toxicity of cyanogenetic plants to herbivora. —G. D. S.

I. Rose, A. L. (1941). **A Clinical Survey of Intoxications of Cattle by Sudan Grass (Sorghum sudanese).** —*Aust. vet. J.* **17.** 211–219. **2022**

II. Hindmarsh, W. L. (1941). **Poisoning of Cattle by Sudan Grass and other Cyanogenetic Plants.**—*Ibid.* 219–221. **2023**

I. A study was made of losses from Sudan grass poisoning of cattle and a few sheep from 1931–38. It was found that pure Sudan grass might be just as toxic as its hybrids, and that seasonal conditions affected the toxicity. When rain fell during the heat of summer inducing optimum growth of the plant, and when it had been eaten to the ground by grasshoppers and was re-growing rapidly after rain it was most poisonous. Mortality of animals grazing on other species of sorghum has been recorded. There is some evidence that stock may become tolerant to Sudan grass with a high content of hydrocyanic acid. Treatment consisting of hypodermic injection of sodium nitrite 3 g., sodium thiosulphate 15 g., and water 20 ml., was found to be specific, especially if accompanied by symptomatic treatment. [In the article "nitrate" is misprinted for "nitrite".] There is evidence that cattle will not tolerate a dose much above this amount. R. concludes that none of the sorghum species can be considered safe feed for cattle at any stage of their growth following the conditions described.

II. A discussion of I, and of poisoning of stock by cyanogenetic plants in relation to their content of hydrocyanic acid, the amount eaten, and the time taken to consume it.—B. Johnston.

Morrill, C. C. (1943). **Clover Sickness, or Trifoliosis.** —*N. Amer. Vet.* **24.** 731–732. **2024**

A short account is given of this condition which occurs most frequently in cattle pastured on white clovers. The disease is characterized by a wide variety of symptoms with stomatitis and dermatitis predominating. Unpigmented skin seems to be more susceptible than pigmented areas. Treatment consists in removing the animals from the suspected pasture and keeping them out of bright sunshine.—G. D. S.

Sanders, D. A., Emmel, M. W., & Swanson, L. E. (1942). **Tung Tree** *Aleurites Fordi* **Hemsl. Foliage Poisoning of Cattle.**—*Bull. Fla agric. Exp. Sta.* No. 376. pp.8. **2025**

Fourteen purebred Hereford and Aberdeen-Angus cattle among a herd of 30 animals died as a result of eating green and partly cured foliage of the tung tree which was discarded on the pasture. Cattle pastured in tung-tree groves have not been observed to eat the foliage. Tests conducted on palatability of cut tung-tree foliage show that it is readily consumed when offered to cattle grazing on improved pasture grass. Outstanding symptoms of tung-tree foliage poisoning of cattle consist of profuse diarrhoea containing abundant blood extravasations, loss of appetite, emaciation, and death. The most pronounced P.M. lesions consist of haemorrhagic gastro-enteritis and passive congestion of the great parenchymatous organs of the abdominal cavity.—G. D. S.

Legg, J., & White, C. T. (1941). *Myoporum acuminatum*: **A Plant Poisonous to Stock.**—*Aust. vet. J.* **17.** 104–105. **2026**

M. acuminatum, a shrub widely distributed in Australia, was found in feeding experiments with sheep to be poisonous; ¾ lb. is sufficient to kill adult sheep. The toxic agent appears to be insoluble, since a watery extract produced no symptoms. The chief lesions observed on P.M. examination were congestion of the lungs, congestion of the first few feet of the small intestine, and blood-stained fluid in the abdominal cavity.—B. Johnston.

Emmel, M. W., & Sanders, D. A. (1942). **Crotolaria spectabilis and C. retusa Poisoning of Livestock.**—*Pr. Bull. Fla agric. Exp. Sta.* No. 574. pp. 3. **2027**

Several species of *Crotalaria* have been used extensively as cover crops in Florida; they are valuable green manure crops and two species have been used as feed for cattle. The plant is leguminous and grows luxuriantly on light sandy soils. Experiments have shown that some of the species are poisonous to livestock and this finding has been confirmed by reports from the field.

C. spectabilis is the most prevalent and also the most toxic of the species. Two types of poisoning have been observed in cattle, acute and chronic. Acute poisoning is characterized by slight bloat, straining, loss of appetite, passage of blood in the faeces, and often by slight bloody nasal discharge. In chronic poisoning these symptoms are not marked, and animals often die 4–5 months after consuming the plant. Sheep and goats show symptoms similar to those observed in cattle. In pigs the acute form is characterized by sudden death, and the chronic form by anorexia, unthriftiness, and anaemia; similar symptoms occur in chickens. Horses have been observed to die of *Crotalaria* poisoning six months after consuming the plant. Nervous symptoms of a non-violent nature and some degree of diarrhoea are usually observed. There is no cure for animals affected with *Crotalaria* poisoning; treatment may prolong life but seldom results in recovery. —G. D. S.

Mulhearn, C. R. (1942). **Poison Peach** (*Trema aspera*)**: A Plant Poisonous to Stock.**—*Aust. vet. J.* **18.** 68–72. [Author's summary copied *verbatim*]. **2028**

Trema aspera, a shrub or small tree occurring in Queensland, parts of New South Wales, North-west

Australia, and New Guinea, has been suspected for many years of poisoning cattle, although the plant is palatable to bovines, and they have been seen to eat it without harmful effects.

Feeding experiments were carried out with steers, sheep and goats with fatal results in all species. Quantities as low as 5 lbs. and ¾ lb. proved toxic to a steer and a goat respectively. There is no evidence to suggest that the active principle of the plant is prussic acid. The symptoms and post-mortem findings and results of analyses suggest that some other principle is involved.

EDGAR, G., & ROPERT, J. (1942). **The Toxicity of *Didiscus glaucifolius*, " Wild Parsnip ", for Sheep.**—*Aust. vet. J.* **18.** 125–126. **2029**

The continuous feeding of *D. glaucifolius* to young sheep caused incoordination in gait and inability to withstand even slight physical exertion. Forced exercise caused collapse and, if continued, resulted in death. Two out of three young sheep were affected and diarrhoea occurred in one of them, but two four-year-old wethers consumed larger quantities without apparent effect. These results confirm the effects of this plant as reported from the field. It is also claimed by graziers that deformed lambs are born from ewes grazing on the plant, but this claim was not investigated.—D. A. G.

GARDNER, C. A. (1942). **Gascoyne Stock Route Poison Plants.**—*J. Dep. Agric. W. Aust.* **19.** 84–95. **2030**

This is a record of a survey to discover the cause of stock poisoning along certain stock routes. The following poison plants were found :– *Nicotiana* spp., *Tribulus* spp., *Datura Leichhardtii*, *Lotus australis*, *Tephrosia rosea*, *Morgania floribunda*, *Euphorbia Drummondii*, and *E. boöphthona*.—H. McL. GORDON.

HART, L. (1941). **The Toxicity of Seeds of *Argemone mexicana* for Fowls.**—*Aust. vet. J.* **17.** 69–71. **2031**

A. mexicana, known as Mexican poppy, is a common weed of pastoral and wheat-growing areas in Eastern Australia. Its seeds are often harvested with the wheat and when fed to poultry have toxic effects. An outbreak of a disease of fowls, in some cases fatal and apparently due to ingestion of the poppy seeds, is described ; their toxicity for fowls was demonstrated by feeding tests.—B. JOHNSTON.

HOLMBOE, F. V. (1944). En forgiftning på rev med pigghå. Kortvarig somnolens etter fôring med pigghå, Squalus Acanthias. [**Poisoning of Foxes by Dogfish** (*Squalus acanthias*)].—*Norsk VetTidsskr.* **56.** 63–67. **2032**

H. describes a peculiar affection of foxes fed on dogfish. The attacks which lasted only about 10 min. began soon after the meal and consisted of sudden cessation in activity followed by crouching on the ground with the head stretched along the forefeet, giving the appearance of sleep. Recovery was prompt and no after-effect was noted. The fish was undoubtedly involved in the cause, but it is not known in what manner.

Symptoms of " toxicity " caused by other fishes are cited, but very little is known about the nature of this type of disorder.—J. E.

See also absts. **1922, 2050, 2058** (toxicity of sulphonamides).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

—. (1943). **Ministry of Health. National War Formulary. For general use in war time by medical practitioners, pharmacists, hospitals and others concerned with the prescribing and dispensing of medicines. Compiled by a Committee appointed by the Minister of Health.** pp. 76. London : H.M. Stat. Off. [6d.] [2nd Edit.] **2033**

Useful prescriptions are given for drugs in general use. The main aim is to restrict the use of drugs in short supply and the prescribing of a number of these (*e.g.* agar, alcohol, sugars, glycerin, bismuth, liquid paraffin, sulphonamides) is discussed. Equivalent official preparations for a number of proprietary preparations are given in a table. The simplification of prescribing introduced in the formulary is, apart from the saving of drugs, probably of value for the patient too.—J. M. ROBSON.

GORECZKY, L., & VON LUDÁNY, G. (1942). Die Wirkung intraduodenaler Salzsäureeinführung auf die bakterizide Fähigkeit des Serums. [**Action of HCl Introduced into the Duodenum on the Bactericidal Power of Serum**].—*Z. ImmunForsch.* **102.** 226–232. **2034**

Dogs which had been starved for 24 hours were anaesthetized and 2–3 ml. per kg. of a 0·4% HCl solution introduced into the duodenum by means of a cannula passed through the abdominal wall. Blood samples were taken before and after the introduction of acid. The samples were mixed with various bacteria (*Salmonella typhi*, staphylococci, *Bacterium coli*, and *Vibrio cholerae*) and the mixture poured in agar plates. The number of colonies developing after incubation was counted.

On the average, the bactericidal power of serum was increased by 24% after the introduction of hydrochloric acid. The introduction of saline did not have this effect. It was shown that this change was not due to simple concentration of the serum, neither could it be explained by contraction of the spleen.—J. FRANCIS.

ANDERSON, W. F. (1944). **The Tonic Action of Strychnine.**—*Brit. med. J.* March 11th. 360–361. **2035**

Strychnine administered subcutaneously caused increased volume and acidity of gastric juice, stimulated the fasting stomach to active contractions, and in some cases hastened the emptying time of the stomach after a test meal. It appeared to have no regular effect upon the weight or blood picture of convalescent patients. —RACHEL MARSHALL.

I. HEGSTED, D. M., MCKIBBIN, J. M., & STARE, F. J. (1944). **Nutrition and Tolerance to Atabrine.**—*J. Nutrit.* **27.** 141–148. **2036**

II. HEGSTED, D. M., MCKIBBIN, J. M., & STARE, F. J. (1944). **The Effect of Atabrine on Choline Deficiency in the Young Rat.**—*Ibid.* 149–153. **2037**

I. In long-term experiments with rats, atebrin appeared to be without adverse effect upon growth, general appearance, behaviour, gross or microscopic appearance of the tissues, or reproductive ability when added to an otherwise adequate synthetic diet in amounts equivalent to a daily intake of 25 mg. per kg. body weight. When added to the diet at levels of 40–65 mg. per 100 g. of ration, however, atebrin depressed growth and caused an unkempt appearance and discoloration of the fur. These adverse effects were not counteracted by heavy dosage of vitamins A, B complex, D, and E, nor by increased amounts of yeast or casein.

The slow growth on rations containing suboptimal amounts of either riboflavin or casein was accentuated by the incorporation in such diets of 40 mg. atebrin per

100 g., but no such effect was noted when similar amounts were added to a vitamin A deficient diet.

Young White Leghorn chicks proved to be much less susceptible than rats to the toxic effects of atebrin.

II. In paired-feeding experiments using diets low in choline, it was found that the incorporation of 65 mg. atebrin per 100 g. ration prevented almost completely the development of haemorrhagic kidney lesions in the young rat, although it exerted no lipotropic activity. At a level of 40 mg. per 100 g. ration, activity was less but was still sufficient to prevent death.

The efficiency of food utilization was less in the atebrin-fed rats than in the paired-fed controls, but the discrepancy was not very great. As the authors point out, if such a relatively slight difference in food utilization was directly responsible for the protective action of atebrin, then much care is necessary in evaluating the choline-like activity of different compounds.

—Alastair N. Worden.

Robson, J. M., & Ansari, M. Y. (1943). **The Fate of D.B.E. (αα Di-(p-Ethoxyphenyl) β-Phenyl Bromo-Ethylene) in the Body.**—*J. Pharmacol.* **79.** 340–345. **2038**

D.B.E. was administered to ovariectomized mice by stomach tube. Twenty-four hours later, less than 50% of the dose could be recovered from the body, but after that the elimination became slower and was almost completed in three weeks. The highest concentration of the substance was found in the body fat from which it was more slowly eliminated than from the rest of the body. Only 5–10% of the dose given could be recovered from the excreta, most of this being recovered from the faeces. *In vitro* experiments suggested that the liver does not play an important part in the inactivation of the substance. It is suggested that D.B.E. may be suitable for the treatment of conditions in which prolonged oestrogenic action is required.—J. M. R.

Brownlee, G., Copp, F. C., Duffin, W. M., & Tonkin, I. M. (1943). **The Antibacterial Action of some Stilbene Derivatives.**—*Biochem. J.* **37.** 572–577. **2039**

Of a number of compounds of the stilboestrol type tested *in vitro* for bactericidal activity against staphylococci and streptococci, deoxydiethyl stilboestrol and its dihydro derivative were found to be most active, the former being 40 times as active as the mould metabolic product, citrinin, and as active as chloroxylenol under the conditions employed. Oestrogenic properties did not run parallel with bactericidal properties. The compounds showed little or no activity *in vivo* in mice.

—Rachel Marshall.

Goetchius, G. R., & Lawrence, C. A. (1944). **The Antibacterial Effects of Various Acridine Compounds.**—*J. Lab. clin. Med.* **29.** 134–138. **2040**

A series of 11 acridine compounds was tested *in vitro* against the growth of types of pneumococci, streptococci, *Staphylococcus aureus, Pseudomonas pyocyanea, Clostridium welchii,* and *Cl. septicum.* Rivanol lactate (2 ethoxy 6 : 9 diamino acridine lactate) and rivanol azo sulphanilamide (2 ethoxy 6 : 9 diamino acridine azo sulphanilamide) were about as effective as acriflavine and proflavine. The acridine compounds studied appeared to be bactericidal rather than bacteriostatic.—E. Boyland.

Atkinson, N. (1943). **Antibacterial Substances Produced by Microorganisms, with special Reference to those Produced by Moulds.**—*Med. J. Aust.* April 24th. 359–362. **2041**

Of 39 moulds, 16 were found to possess antibacterial activity. All the active moulds were penicillia and were divided into two groups; group I was found mainly as a contaminant of culture media while group II was found mainly on fruit. Group I was active against both the Gram-positive and Gram-negative organisms tested. It appeared desirable to test moulds for activity after 4–6 days' growth. A. considers that the activity of group I may be due to penicillin or citrinin and that the activity of group II is probably due to an undescribed substance.—D. F. Stewart.

Enoch, H. E., & Wallersteiner, W. K. S. (1944). **A Standardized Antibacterial Pyrogen-free Metabolite Preparation containing Living *Penicillium notatum*. [Correspondence].**—*Nature, Lond.* **153.** 380–381. **2042**

A brief report is given of the antibacterial properties of a suspension of *P. notatum* hyphae in a fluid medium obtained from below the mycelium of the mould at the stage of its highest rate of penicillin production and freed from pyrogens and other impurities. Twenty-one cases of animal infections including staphylococcal, streptococcal, pneumococcal, and *Bacterium coli* infections were treated with the suspension. Of these 14 were cured, in three cure was doubtful and inconclusive, and in four there was no beneficial action; no ill-effects were observed in any of the cases. Virus infections did not respond to the treatment. The preparation seemed to be exceptionally potent in the treatment of open wounds with pyrogenic mixed infections and also when used intramuscularly for the treatment of pyrogenic and gastro-intestinal infections.

—R. Allcroft.

Rao, S. S., & De, S. P. (1943). **Production of Penicillin. [Correspondence.]**—*Current Sci.* **12.** 209. **2043**

When *Penicillium notatum* was grown on a semi-solid medium in place of the usual Czapek-Dox solution, the rate of penicillin production was considerably increased. The penicillin is formed more rapidly than the dye, crysogenin, and the penicillin appears to be more stable than it is in liquid media.—E. Boyland.

I. —. (1943). **Penicillin. Annotated Bibliography (No. 1–81) with detailed subject index.** pp. 60. New York : Winthrop Chemical Company, Inc. [8vo]. **2044**

II. Whalley, M. E. (1943). **Abstracts on Penicillin and Other Antibiotic Substances.**—*Publ. nat. Res. Coun. Canad.* No. 1160. pp. 71. [4to] [Mimeographed]. [$1.00]. **2045**

I. In this booklet, 81 abstracts are given of papers which have been published concerning penicillin. They are arranged in alphabetical order according to the author and a good subject index is appended.

I. This is a mimeographed collection of 185 abstracts on penicillin and other antibiotic substances, taken mostly from the American journal *Chemical Abstracts* and covering the period from 1917 to September 10th, 1943 inclusive. The abstracts are numbered and arranged according to author and an index of the antibiotic substances dealt with is given, showing which abstracts deal with the respective substances.—R. A.

Barron, J. N., Christie, R. V., Fraser, D. B., Garrod, L. P., Mansfield, O. T., Morgan, H. V., Mowlem, R., Robertson, I. M., Roxburgh, A. C., & Roxburgh, I. A. (1944). **An Investigation of the Therapeutic Properties of Penicillin. A Report to the Medical Research Council.**—*Brit. med. J.* April 15th. 513–530. **2046**

About a year ago when supplies of penicillin from commercial sources had reached a sufficient proportion, some was placed at the disposal of the Medical Research

Council, and through its Penicillin Clinical Trials Committee several centres were established for further therapeutic study. The present report, from one of these centres, takes the form of eight separate papers on different aspects of the subject. CHRISTIE and GARROD define the policy at the centre, which was to explore further the possibilities of local treatment in as many directions as possible and to confine systemic treatment, as a general rule, to early cases of infection of bone.

MORGAN, CHRISTIE, and I. A. ROXBURGH discuss the systemic methods of administration of penicillin. Continuous intravenous drips and intermittent intramuscular injection are the two methods which have usually been used. The difficulty with the former is the development of thrombophlebitis which is an indication for stopping the infusion. New methods suggested are drip transfusion into bone marrow and continuous intramuscular drip transfusion; local abscesses may develop with the latter method.

MOWLEM describes the treatment of mandibular infection with penicillin; the drug is regarded as an adjuvant and complete removal of dead bone is essential. Under these conditions a closed method of treatment can be used with good results. In acute osteomyelitis the systemic administration of penicillin, together with surgical interference, give, according to ROBERTSON, good results. In chronic bone sepsis the systemic or local use of penicillin has been disappointing. On the other hand, soft tissue infections were found to react favourably to the use of penicillin (BARRON and MANSFIELD). Early application of the drug is most desirable and an efficient technique must be used to bring the drug into contact with the infective process. A special aspect of this is the use of penicillin in the local treatment of breast abscess, described by DONALD. As a result of his experience, D. is now going to drain by surgical means, and then instil penicillin through an indwelling catheter.

ROXBURGH, CHRISTIE, and ROXBURGH describe the use of penicillin in skin conditions. The obvious value in sycosis barbae is very interesting; favourable effects have also been obtained in the treatment of impetigo, blepharitis, some cases of chronic eczema with secondary infections and some cases of otitis externa.

Lastly, GARROD describes the various laboratory tests necessary for effective treatment with penicillin. In view of the lability of the material, special precautions are necessary in making up solutions and in their storage and use. The drug is effective only against certain organisms and this has to be taken into account in treatment. It is also necessary to determine whether chemotherapeutic concentrations are being produced by the method of administration used. It is to be hoped that, when the use of the drug becomes more standardized, fewer laborious and time-consuming laboratory tests will be necessary.—J. M. ROBSON.

MCINTOSH, J., & SELBIE, F. R. (1943). **The Production of Drug-Resistant Cultures of Bacteria *in vitro* and a Study of their Inter-Relationships.**—*Brit. J. exp. Path.* **24.** 246–252. **2047**

Drug resistance was examined *in vitro* using several strains of *Streptococcus pyogenes* (Group A) and a single strain of *Staphylococcus pyogenes* (B.S.I. 152). Drug resistance was produced by making successive titrations of the action of the drug against the organism and at each titration taking the inoculum from the tube showing growth with the greatest concentration of the drug in the previous test. Strains produced by this method appear to be permanently resistant.

Drug-resistant cultures can be produced easily against some drugs but only with difficulty against others. *Str. pyogenes* after treatment withstood 600 times as much sulphanilamide as at the beginning of the experiment; *Staph. pyogenes* withstood 64 times as much propamidine and penicillin, 16 times as much proflavine, and 8 times as much quindoline methochloride. With streptococci there was difficulty in producing resistance to the acridines and to some extent to propamidine. With staphylococci, difficulty was encountered with 2: 7-diaminoacridine, 5-aminoacridine, rivanol, proflavine, and crystal violet.

Investigation was also made of the extent to which drug-resistant cultures were resistant to drugs of other chemical constitution. It was demonstrated that sulphonamide-resistant strains resisted to some degree all other sulphonamides except marfanil.

In the acridine group, cultures which readily became drug resistant showed distinct cross-resistance among themselves, but those in which drug resistance was produced only with difficulty did not show this characteristic.

Cultures resistant to propamidine were also resistant to the first acridine group.—D. D. OGILVIE.

DORFMAN, A., & KOSER, S. A. (1942). **Mechanism of Action of Certain Sulfonamide Compounds.**—*J. infect. Dis.* **71.** 241–252. **2048**

When two strains of *Bacterium flexneri* were grown on media deficient in nicotinamide, they showed reduced respiration which was increased by addition of nicotinamide. This increase in respiration is prevented by sulphathiazole or sulphapyridine but not by sulphanilamide. The inhibition of respiration by these sulphonamide compounds is not reversed by *p*-aminobenzoic acid. On the other hand, the inhibitory effect of the sulphonamides on growth is reversed by *p*-aminobenzoic acid.—E. BOYLAND.

GILLIGAN, D. R. (1943). **Blood Levels of Sulfadiazine, Sulfamerazine and Sulfamethazine in Relation to Binding in the Plasma.**—*J. Pharmacol.* **79.** 320–328. **2049**

The drugs sulphamerazine, sulphamethazine, and sulphadiazine were compared in relation to the power of plasma protein to bind them and render them non-dialysable. Experiments in which they were added to oxalated blood which was then dialysed indicated that the first two are much more bound than is sulphadiazine. A similar conclusion may be drawn from data for absorption, excretion, and blood levels in man following single doses of the drugs. The relationship between their acetyl derivatives was the same. The distribution of the drugs between red cells and plasma was very variable.—RACHEL MARSHALL.

STOLL, R. (1942). Action de la soluseptazine sur le développement du duvet de l'embryon de poulet. **[Action of Soluseptasine on the Development of the Feathers of Chick Embryos].**—*C. R. Soc. Biol. Paris.* **136.** 346–347. **2050**

Malformations of the chick embryo were reported by ANCEL & LALLEMAND [*V. B.* **13.** 438.] following injection of 1·25–15 mg. of soluseptasine and 48 hours' incubation. The malformations consisted of brachymelia and formation of a raptorial beak.

S. reports anomalous feather development in similar experiments, and gives details of doses used. Small piriform masses, ½–1 mm. in diameter and 1–3 mm. in length, attached by pedicles, are formed at definite parts of the plumage. These are cystic dilatations, formed of four or five layers of flattened keratinized cells; a multilaminate epithelium is formed from hypertrophied cylindrical cells, and the central cavity of the

cyst consist of mesenchymatous connective tissue containing a network of capillaries. In the initial stages, an oedematous effect is seen. The cubical cells of the Malpighian layer, normally lying along the axis of the feather, are orientated to become perpendicular and subdivide. When incubation is complete, these are cylindrical, the epithelium is completely keratinized, and the connective tissue and capillaries of the cavity have gone.

These anomalies may or may not be accompanied by those reported by Ancel and Lallemand.—O. H.

RANTZ, L. A., & KIRBY, W. M. M. (1944). **Quantitative Studies of Sulfonamide Inhibitors.**—*J. Immunol.* **48.** 29–37. 2051

The effect of variation was studied in the medium on which *Bacterium coli* grew with and without sulphadiazine. The addition of small amounts of peptone or yeast extract to the media reduced the inhibition of growth due to sulphadiazine. Increasing the concentration of peptone or yeast extract from 2 to 15% had a very slight effect on the inhibition of growth by sulphadiazine. The addition of the amino acids of a casein hydolysate reduced the extent of inhibition by sulphadiazine by an amount varying continuously with the amino-acid concentration up to 20%. Addition of methionine or of glucose did not neutralize the growth-inhibiting effect. When the organisms were grown at temperatures varying from 20°–45°C., it was found that growth inhibition was greater if the temperature was above 37°C. or below 34°C. It is suggested that sulphonamides interfere with amino-acid synthesis by bacteria and that *p*-aminobenzoic acid is essential for such synthesis.—E. BOYLAND.

LWOFF, A., NITTI, F., TRÉFOUËL, J., & HAMON, V. (1941). Recherches sur le sulfamide et les antisulfamides. I. Action du sulfamide sur le flagellé *Polytomella caeca*. II. Action antisulfamide de l'acide *p*-aminobenzoïque en fonction du pH. **[Research on Sulphonamides and Anti-Sulphonamides. I. Action of Sulphonamides on the flagellate *Polytomella caeca*. II. Anti-Sulphonamide Action of *p*-Aminobenzoic Acid according to pH].**—*Ann. Inst. Pasteur.* **67.** 9–36. 2052

LWOFF, A., NITTI, F., & TRÉFOUËL, J. (1941). Recherches sur le sulfamide et les antisulfamides. III. Action du sulfamide sur le développement d'*Escherichia coli* et de *Proteus vulgaris X 19*. **[Research on Sulphonamides and Anti-Sulphonamides. III. Action of Sulphonamides on *Bacterium coli* and *Proteus vulgaris* X19].**—*Ibid.* 173–185. 2053

I & II. Sulphanilamide acts on the flagellate. It does not kill it but inhibits the growth of cultures. Under normal conditions the organism divides at intervals of 3½–4 hours; in the presence of sulphanilamide the organism may become blocked (*i.e.* no divisions occur) for at least three weeks. By repeated passage of the flagellate through sulphanilamide, resistance may develop; this may be due to an increase in the production of an antisulphonamide substance. The action of sulphanilamide on the flagellate is inhibited by *p*-aminobenzoic acid (PAB). Cultures blocked by sulphanilamide for several weeks will start dividing again when PAB is added. The activity of PAB varies with the pH, the curve of activity being similar to the dissociation curve. The activity of PAB is at a maximum at the iso-electric point, and it is suggested that the undissociated form of PAB penetrates more rapidly into the flagellates than the ionized form, thus accounting for its greater activity.

III. Multiplication of *Bact. coli* in a synthetic medium occurs much more slowly in the presence of sulphanilamide both after small and large inoculations. In the presence of a sulphanilamide solution of $\frac{M}{172}$, the first division of *P. vulgaris* is normal, but the rate of subsequent divisions becomes gradually diminished. When the concentration of sulphanilamide is then decreased to $\frac{M}{860}$, the rate of division again increases. Certain peptones contain a quantity of antisulphonamide substance corresponding to 0·2% of PAB. A 2% solution of these peptones contains sufficient antisulphonamide to neutralize the action of a concentration of sulphanilamide corresponding to several times that of a saturated solution of the drug.—J. M. ROBSON.

ROBINSON, H. J., SIEGEL, H., & GRAESSLE, O. E. (1943). **Studies on Sulfapyrazine.**—*J. Pharmacol.* **79.** 354–363. 2054

Rats receiving sulphapyrazine or sulphadiazine revealed the same qualitative pathological changes following prolonged administration. The incidence of concretion formation appears to be greater with sulphapyrazine than with sulphadiazine, but this can be prevented, with both drugs, by alkalization of the urine. Sulphapyrazine and sulphadiazine appear to be equally effective against experimental pneumococcal, streptococcal, and staphylococcal infections when compared on the basis of equal blood concentrations.—J. M. R.

*GUÉRY. (1942). Contribution à l'étude du camphosulfonate de sulfamide ou corps 809, en médecine vétérinaire. **[Camphosulphonate of Sulphanilamide (Substance 809) in Veterinary Medicine].**—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 61]. 2055

Acting on the results obtained in human pathology with the camphosulphonate of sulphanilamide, G. has applied the drug to veterinary medicine. He describes the chemical study of the substance, gives results of work on the mouse and rabbit, and his own results with *humeurs organiques*. Experiments on carnivorous animals and horses showed that the optimum daily doses and methods of administration were :– 70 ml. of 25% solution for horses and 50 ml. for dogs, intravenously; 15 tablets of 0·25 g. each for dogs and 8 for cats, *per os*.

The substance can also be applied locally to wounds by insufflation of the pure powder, or by irrigation with a freshly made solution of 10% of the camphosulphonate (made up in boiling water).—O. HANDS.

VÖHRINGER, K. (1943). Oertliche Anwendung von Sulfonamidpräparaten in der Tierheilkunde. **[Local Use of Sulphonamides in Veterinary Medicine].**—*Berl. Münch. tierärztl. Wschr.* April 16th. 109–111. 2056

The use of marfanil-prontalbin in veterinary medicine is described. [This preparation has now been captured from the Germans and its properties studied (see abst. 2057 below).] It gave good results when applied to various infected wounds in animals. It was less effective in preventing infection of the damaged vagina of the mare or cow following parturition.—J. F.

MITCHELL, G. A. G., REES, W. S., & ROBINSON, C. N. (1944). **Marfanil and Marfanil Prontalbin.**—*Lancet.* **246.** 627–629. 2057

Marfanil is a sulphonamide (4-amino-methylbenzene sulphonamide) whose properties were described by DOMAGK [see *V. B.* **13.** 262, absts. 1745 & 1749]. It has been used either alone or in combination with sulphanilamide (prontalbin). The authors, who obtained a supply of these drugs from the Germans in the desert battles in Africa, tried them in a total of 48 cases in various types of septic conditions. Local and general

administration was used. It is concluded that marfanil gives better results than any of the commonly used drugs, apart from penicillin.—J. M. ROBSON.

ALSTRÖM, I. (1943). Några iakttagelser i samband med sulfonamidterapi hos hund. (Förutskickat meddelande). **[Sulphonamide Therapy in Dogs].**—*Skand. VetTidskr.* **33.** 357–367. [In Swedish: English summary]. 2058

Experiments on a few dogs established the following facts :– that acetylation of sulphonamides does not occur to the same extent in dogs as it does in herbivora unless *p*-aminobenzoic (PAB) acid is also available. When sulphanilamide, sulphapyridine, or sulphathiazole were given alone in doses of 2–3 g. daily for about a week, practically no acetylation occurred, but when PAB acid was given in daily doses of 0·1–0·3 g. daily with the sulphonamide, then a substantial proportion of the latter was acetylated. The inference is that acetylation is possible only if PAB acid is available.

PAB acid also prevented the urinary crystallization of sulphapyridine and sulphathiazole and reversed acetylation in the urine—*i.e.* any sulphonamide which had become acetylated in the blood was de-conjugated in the urine, so that urine contained only the free form of the drug.

The above PAB acid effects could also be elicited in dogs fed with yeast, which contains this acid, but ortho- or meta-aminobenzoic acid were inactive.

The dependence for acetylation on PAB acid was also demonstrated *in vitro*, whereby cultures containing sulphanilamide, sulphapyridine, or sulphathiazole after inoculation with a resistant strain of a β-haemolytic streptococcus from a dog were found to contain the drug in a variable state of acetylation, due to the provision of PAB acid by the organism.

A. has calculated that the proportions of PAB acid to drug to facilitate acetylation are as follows :– for sulphanilamide 1 : 500–1 : 1,000, for sulphapyridine 1 : 100–1 : 200, and for sulphathiazole 1 : 20–1 : 40. —J. E.

LONG, P. H., BLISS, E. A., & OTT, E. (1941). **Studies on Sulfadiazine. I. The Chemotherapy of Experimental Haemolytic Streptococcal, Pneumococcal and Staphylococcal Infections in Mice.**—*Johns Hopk. Hosp. Bull.* **69.** 297–302. 2059

TREVETT, G. I., NELSON, R. A., & LONG, P. H. (1941). **Studies on Sulfadiazine. II. The Clinical Use of Sulfadiazine in the Therapy of Bacterial Infections, other than Pneumonia.**—*Ibid.* 303–313. 2060

BILLINGS, F. T., Jr., & WOOD, W. B., Jr. (1941). **Studies on Sulfadiazine. III. The Use of Sulfadiazine in the Treatment of Pneumococcal Pneumonia.**—*Ibid.* 314–326. 2061

I. Data on mice show that sulphadiazine is an effective chemotherapeutic agent in the control of experimental haemolytic streptococcal, staphylococcal, and pneumococcal infections. Relatively high blood concentrations can be easily produced and maintained with the drug and they are well tolerated over long periods with no apparent ill-effects.

II. Clinical data show that sulphadiazine is very satisfactory in the treatment of haemolytic streptococcal infections; there are also some data which suggest that the drug is of value in meningococcal and staphylococcal infections. It is well tolerated and the authors believe that it is the best available drug for the treatment of chronic bacterial infections which require long-continued therapy.

III. Seventy-five cases of pneumococcal pneumonia were treated with sulphadiazine; all but one patient survived. The drug is only slowly absorbed during the first 24 hours of therapy; in treating critically ill patients it is thus necessary to inject sodium sulphadiazine intravenously in order to obtain an effective blood level rapidly. High blood levels are easily maintained and well tolerated. Only a small fraction of the circulating drug normally is acetylated and the incidence of toxic reactions was low (only 5·7%).—J. M. ROBSON.

BENNETT, T. I., & PARKES, T. (1944). **Penicillin in Sulphonamide-Resistant Pneumonias. With Special Reference to Staphylococcal Infection and Empyema.**—*Lancet.* **246.** 305–308. 2062

Four cases of staphylococcal pneumonia, two of streptococcal empyema, and one of staphylococcal empyema were treated systemically with penicillin and all recovered completely. Of these cases, six were wholly and one practically resistant to sulphonamide therapy. The results also suggest that local penicillin therapy (in combination with general therapy) may cure empyema without surgical intervention.—J. M. ROBSON.

CLARK, C. F. (1943). **Tyrothricin in the Treatment of Bovine Pyometritis.**—*M[ich]. S[t]. C[oll]. Vet.* **3.** 133 & 153–155. 2063

A report of two cases of pyometra which were subjected to various forms of treatment, including irrigation with tyrothricin. The uteri of both cows became normal but there is no history of service or conception.—JOHN FRANCIS.

HIGGINS, G. M., & FELDMAN, W. H. (1944). **Effect of Yeast Upon the Toxic Reactions of Promin on Tuberculous Guinea Pigs.**—*Amer. Rev. Tuberc.* **49.** 179–184. [Spanish summary]. 2064

In view of the many published results indicating the effect of a high vitamin B diet in minimizing the toxic symptoms of the sulphonamide compounds and the sulphone, promin, in white rats, the effect of a diet containing 13% brewer's yeast on the blood picture of tuberculous g. pigs treated with promin was investigated. It was found that this supplemented diet did not significantly improve the blood dyscrasia induced by the drug, nor modify its therapeutic efficacy. Nevertheless it is suggested that further studies, directed toward the possible role of nutritional factors in precluding or alleviating the toxic effects of promin, might prove useful.—J. LOCHIEL MCGIRR.

CARMICHAEL, J., & BELL, F. R. (1944). **A Study of the Therapeutic Action of the Phenanthridinium Compound 897 against *Trypanosoma congolense* Infection in Cattle.**—*J. comp. Path.* **54.** 49–52. 2065

The value of the phenanthridinium compound 897 (*i.e.* 7 amino-9 (*p*-aminophenyl)-10-methyl-phenanthridinium chloride) was investigated against *T. congolense* in cattle. To determine the toxicity of the drug, healthy cattle were given varying doses intravenously. The highest non-toxic dose intravenously was found to be 3·0 mg. per kg. body weight but owing to the low solubility of the compound saturation dosage as a routine measure is not practicable. No appreciable changes were found in the red and white cell counts, haemoglobin, colour index or cell volumes, nor were there any significant changes in the blood glucose, chloride, nitrogen, CO_2 and phosphorus values. The results of preliminary trials in which cattle were experimentally infected with two strains (Kikaya and Buruli) and treated with 2 mg. per kg. body weight showed that the compound had a useful therapeutic action on *T. congolense* infection in cattle and suggest that it is worth more extended use. The intravenous route or the intravenous and intramuscular routes combined proved to be the best; the other routes or combinations

of routes were ineffectual with a dose of 2 mg. per kg. Prophylactic trials showed that the drug protected against a very heavy infection up to 48 hours after administration.—R. Allcroft.

I. Rodaniche, E. C. (1943). **The Fate of the Virus of Lymphogranuloma Venereum in Infected Mice Receiving Sulfonamide Therapy.**—*J. infect. Dis.* **73.** 173–179. **2066**

II. Toomey, J. A., & Takacs, W. S. (1944). **Chemotherapy of Lymphocytic Choriomeningitis in Mice and Guineapigs.**—*J. Immunol.* **48.** 49–55. **2067**

I. Mice were inoculated intracerebrally with the virus of lymphogranuloma venereum and then treated with sulphadiazine or sulphathiazole. In all mice there was an initial drop of the brain-virus titre immediately after inoculation. In both sulphonamide-treated and untreated animals the virus then underwent rapid multiplication. Rupture of the invaded cells liberated virus into the surrounding tissue fluids, and in untreated animals there was transport of the virus to new locations as indicated by its presence in the spleen. In treated mice the virus was reduced in quantity or destroyed so that there was no widespread invasion, and symptoms were minimal. It is stated that the failure of the virus to be completely eliminated from the brain or to develop resistance to sulphonamides suggests its possible protection by an intracellular habitat.

II. Careful experiments showed that when a lethal dose of lymphocytic choriomeningitis virus was used as the infecting agent in g. pigs or mice, neither the original prontosil of Domagk nor neoprontosil prevented death or lengthened the survival time of treated animals.
—John Francis.

Quayle, H. J. (1943). **The Increase in Resistance in Insects to Insecticides.**—*J. econ. Ent.* **36.** 493–500. **2068**

Experimental evidence is quoted to show that seven species of insects, representing four orders with widely different food habits, have permanently increased their normal resistance to insecticides. One species is of great veterinary importance, the screwworm, *Cochliomyia americana*. The insecticides include contact and stomach poison sprays, fumigants, and a bait spray. In the case of the screwworm, Knipling [*V. B.* **13.** 228.] demonstrated an increased resistance to phenothiazine incorporated in the medium in which the larvae were reared.—W. Moore.

Turner, A. W. (1943). **Spontaneous Oxidation of Arsenical Cattle-dipping Fluids and its Possible Control by means of Lactose.**—*J. Coun. sci. industr. Res. Aust.* **16.** 129–134. **2069**

Spontaneous oxidation of arsenical cattle-dipping fluids commonly occurs where the dip is not used regularly. The addition of milk or casein has been recommended in order to prevent oxidation. It is shown that in a standard sodium arsenite cattle dip of 2,250 gal. capacity in which, through oxidation, the As_2O_3 content had fallen from 8 lb. per 400 gal. to 4·5 lb. per 400 gal., the addition of 6 lb. lactose was followed within three days by almost complete reduction of arsenate to arsenite. Lactose appears to have some advantages over casein in saving time, labour, and cost.
—H. McL. Gordon.

Enzie, F. D. (1944). **Preliminary Tests of Perthiocyanic Acid as a Teniacide.**—*Proc. helminth. Soc. Wash.* **11.** 18–21. **2070**

Perthiocyanic acid was tested as a taeniatide for dogs, the efficacy being based on the number of scolices recovered after treatment, and the number recovered at P.M. examination 8–13 days later. Immature *Dipylidium* recovered P.M. were not considered to represent a reinfestation, although this tapeworm has been reported to reach maturity in about 20 days. When administered at dosage rates of 0·1–0·2 g. per lb. body weight, perthiocyanic acid removed all of 37 *Taenia* from three dogs and 73% of 78 *Dipylidium* from eight dogs. At a dosage rate of 0·05 g. per lb. body weight, the recrystallized drug removed 44% of 32 *Taenia*, but none of 42 immature *Dipylidium* from one dog. The drug had a negligible effect on ascarids, hookworms, and whipworms.

In testing the toxicity of perthiocyanic acid, three dogs were each given 0·2 g. per lb. body weight and 2–3 hours later two of the three were given a dose of magnesium sulphate. One of these two vomited after receiving the drug and the other vomited two hours after receiving the magnesium sulphate, and each ate part of the vomitus. No other untoward reactions were noted in these two dogs. The dog which was not given a purgative exhibited inappetence, depression, and blood-tinged faeces for two days, but was apparently normal on the fourth day. To test the cumulative toxicity, a dog was given 16 therapeutic doses over a period of 18 days. The first indication of toxicity, *viz*, blood-stained faeces, appeared in the evening after the second dose and subsequently the dog showed rather marked toxic reactions. At P.M. examination at the end of the test period, the most striking feature was marked congestion throughout the carcass.

In two sheep at a dosage rate of 0·1g. per lb. body weight, perthiocyanic acid was toxic and without significant taeniacidal action. Dosage at the rate of 0·25 g. per lb. body weight induced inappetence in a tapeworm-free goat. Dosage at the rate of 0·1 g. per lb. body weight produced slightly blood-stained faeces in one of two tapeworm-free cats, whilst dosage at a rate of 0·05 g. per lb. body weight gave no untoward results.

In dogs the most satisfactory results were obtained when perthiocyanic acid was administered at a dosage rate of 0·1 g. per lb. body weight, without starvation, with a maximum dosage of 5 g. It appears to be advantageous to administer a purgative 2–3 hours after administration of the drug. The present trial indicates that further investigation of perthiocyanic acid as a taeniacide for dogs would be useful.—T. E. Gibson.

*Götze, R. (1943). Behandlung der Lungenwurmkrankheit des Rindes. I. Mitteilung. Intratracheale Verabreichung von Derrophen. [**Treatment of Lungworm Disease in Cattle. I. Intratracheal Administration of Derrophen**].—*Suom. Eläinlääkäril.* **49.** 237. [In German]. [Abst. from abst. in *Maanedsskr. Dyrlaeger.* **55.** 471]. **2071**

After a recital of the clinical picture of lungworm disease, G. reviews previous *in vitro* tests with many remedies, of which the only efficacious one was 2% picric acid. Derrophen emulsion appeared to have a strong effect and *in vivo* trials were also promising.

The dose of 0·75% Derrophen emulsion in water was 80 ml. intratracheally for calves up to eight months old, 100–150 ml. for animals between nine and 18 months of age, and 200 ml. for older cattle. The treatment may be repeated after an interval of 3–4 days. [Results of clinical trials are not described.]—J. E.

Foster, A. O., & Habermann, R. T. (1944). **Observations on Controlling Horse Strongyles with Repeated Small Doses of Phenothiazine.**—*Proc. helminth. Soc. Wash.* **11.** 15–17. **2072**

Four ponies were given phenothiazine in the food at the rate of 5 g. per week, as a single weekly dose or in several smaller doses at shorter intervals. Three

were given a total of 100 g., whilst the fourth was given a total of 70 g. Dilution and flotation counts showed that there was a reduction in the egg counts as early as two weeks after the beginning of the treatment, and new infection was not acquired to any measurable extent after that. Haematocrit readings showed that there was no significant anaemia as a result of the treatment. In contrast to the low or zero egg counts of the treated animals, an untreated control animal showed an egg count varying from 300 to 4,800 per gramme. Ascaris egg counts were not affected by the treatment.—T. E. G.

GORDON, H. McL. (1943). **The Anthelmintic Efficiency of Phenothiazine Against Immature *Trichostrongylus* spp. in Sheep.**—*J. Coun. sci. industr. Res. Aust.* **16.** 1–4. 2073

Thirty worm-free sheep were artificially infected on the same day by administration of 24,000 larvae each of *Trichostrongylus* spp. (chiefly *T. colubriformis*). Ten days later, ten of the sheep were treated with phenothiazine, and five days later again a further ten sheep were treated; ten sheep remained untreated. Treatment was thus carried out against worms 10 and 15 days old. The efficiency of treatment was judged by comparing faecal egg counts carried out daily from the 21st to the 35th day following administration of larvae. Phenothiazine proved to be relatively ineffective against the immature worms. Some of the sheep were treated by direct administration of the drug into the abomasum and some by administration into the rumen, but no difference in efficiency was noted between these two methods.—H. McL. GORDON.

CLARE, N. T., & SIMPSON, J. E. V. (1943). **An Apparent Van den Bergh Reaction in Sheep Dosed with Phenothiazine.**—*Aust. vet. J.* **19.** 116–117. 2074

When the Van den Bergh test for bilirubin is applied to sheep within 48 hours of administration of phenothiazine, a colour which may be confused with azobilirubin is often produced. The colour is due to phenothiazine derivatives (not determined), and is developed by nitrite in the presence of acid. That the colour is not due to azobilirubin is shown by the fact that in the protein-free alcoholic solution it did not change to blue on the addition of concentrated hydrochloric acid.—H. McL. GORDON.

ANDREWS, J. S., & CONNELLY, J. W. (1944). **The Value of Phenothiazine for the Removal of Nodular Worms from Pregnant and Nursing Sows.**—*Proc. helminth. Soc. Wash.* **11.** 13–15. 2075

Fifteen sows were used in this investigation, 12 being treated with phenothiazine 4–11 days before farrowing, and three 5–11 days after farrowing. 30 g. of phenothiazine mixed in the food were given to each animal—a dosage rate of 0·1 g. per lb. body weight. Prior to treatment, the faeces of all the pigs examined contained nodular worm eggs, and the numbers of these were reduced in all cases after treatment. Nodular worms were recovered from the faeces of all the animals dosed, in numbers varying from 67 to 1,812. No ill-effects were observed in either the sows or their litters as a result of the phenothiazine treatment, except that some of the treated animals became constipated. A 30 g. dose of phenothiazine appears to be both effective and non-toxic in removing nodular worms from sows. —T. E. GIBSON.

STAMER, S. (1943). **Effect of a Carcinogenic Hydrocarbon on Manifest Malignant Tumors in Mice. Eradication of Transplanted Leukemia in Mice and Attempts at Inhibition of Other Manifest Malignant Tumors in Mice by Treatment with 9 : 10-Dimethyl-1 : 2-Benzanthracene.**—*Acta path. microbiol. scand.* Suppl. 47. pp. 158. [In English: Danish summary]. 2076

It has been claimed by a number of workers that carcinogenic hydrocarbons are capable of exerting an inhibitory effect on tumours of various kinds—transplanted tumours, spontaneous tumours, tumours induced by carcinogenic hydrocarbons, and transplanted tumours originally induced by carcinogenic hydrocarbons. A similar inhibitory effect has also been claimed for non-carcinogenic but related hydrocarbons. S. reviews this work and concludes that the inhibitory effect is doubtful, particularly because most workers have failed to take into account the loss of weight occurring in the animals receiving carcinogenic hydrocarbons, although it is well known that loss of body weight itself may inhibit the growth of tumours, both transplanted and spontaneous.

S. has carried out a very extensive series of experiments, using three strains of mice and a variety of transplanted tumours (Crocker sarcoma 180, Street sarcoma, mammary carcinoma, squamous cell epithelioma, and leucaemic tissue). The hydrocarbon used was 9 : 10-dimethyl-1 : 2-benzanthracene, given *per os*, intraperitoneally, and intravenously. When due allowance was made for loss of body weight due to administration of the carcinogen, no inhibitory effect could be demonstrated except in the case of transplanted leucaemia in one strain of mice in which the hydrocarbon was given intravenously. The effect on transplanted leucaemia depended on dosage; a total dose of 7·5 mg. was sufficient to inhibit and cure the condition, the animals being alive five months later. The injections of carcinogenic hydrocarbon were begun on the same day as transplantation of leucaemic material and repeated one, two, six, and eight days later (1·5 mg. doses). The injections had no toxic effect on the mice and there was no evidence that subsequent new growths resulted. It is suggested that the possible therapeutic value of the hydrocarbon should be investigated in leucaemia in man.—E. G. WHITE.

LIPSCHÜTZ, A. (1944). **Chemical Structure and Antifibromatogenic Activity of Steroid Hormones.**—*Nature, Lond.* **153.** 260–261. 2077

Substances with progesterone activity have an antifibromatogenic action. The injection of any oestrogenic compound into g. pigs induces formation of fibroids which infiltrate into surrounding tissue. Thus fibromatogenic action was prevented by treatment with progesterone, desoxycorticosterone, dehydrocorticosterone, testosterone, or dihydrotestosterone. Androsterone and pregnanedione had no antifibromatogenic activity.—E. BOYLAND.

—. (1942). **A Practical Method of Treating Sheath Rot in Sheep by Fasting.**—*Inform. Circ. Coun. sci. industr. Res. Aust.* No. 11. pp. 2. [Mimeographed]. 2078

This circular was issued in accordance with the policy of C.S.I.R. (Australia) whereby information is made available at once if it has immediate practical application, thus obviating the inevitable delay associated with the preparation and publication of full reports. Sheath rot (pizzle rot, balanitis, posthitis) is relatively common among wethers in many parts of Australia. It was observed that the lesions of affected sheep which were sent to the McMaster Laboratory generally healed without treatment in about ten days. This was finally attributed to the change in reaction of the urine from alkaline to acid resulting from semi-starvation while in transit and during adaptation to the new environment. A field trial based on this hypothesis gave excellent results. In a further field trial in Queensland, 87

wethers with well marked lesions were kept for ten days in a small bare paddock with water but practically no feed. For a further nine days they were allowed out for an hour's grazing daily. Examination thereafter showed that 62 had completely recovered, 7 had almost completely recovered, 11 were markedly improved, 3 improved, and only 4 showed no improvement.

—D. A. GILL.

I. McINTOSH, J., SELBIE, F. R., HUDSON, R. V., PARKES, T., PATEY, D. H., McMULLEN, H. L., & PILE, G. C. L. (1944). **Sulphathiazole-Proflavine Powder in Wounds.**—*Lancet.* **246.** 591–593. **2079**

II. FEGGETTER, G. Y. (1944). **Sulphathiazole-Proflavine Powder in War Wounds.**—*Ibid.* 593–594. **2080**

III. ASCROFT, P. B. (1944). **Control of Sepsis in a Hospital in North Africa. With Observations on Sulphathiazole-Proflavine Powder in Surgical Wounds.**—*Ibid.* 594–595. **2081**

I. The powder was applied by means of an insufflator, about 0·5 g. per 4 sq. in. being used. Correct dosage is important as this quantity is effective but does not harm the tissues. Wounds were treated on alternate days, and usually became dry in 4–5 days, coinciding with the suppression of infection. Good clinical results were obtained both in the prevention of infection and in the treatment of infected wounds.

II. Sulphathiazole (99%)-proflavine (1%) powder has been used in treating a variety of war wounds. The results have been encouraging and no untoward local effects have been seen. No control treatments could be carried out and these conclusions are based on clinical impressions. It is suggested that with adequate surgical treatment of battle casualties the local use of the powder should enable many wounds to be sutured in safety.

III. The precautions taken to decrease the incidence of sepsis are described in detail. An attempt was made to eliminate, as far as possible, pathogenic organisms from the air and from carriers. To reinforce these steps sulphathiazole (99%)-proflavine (1%) powder was applied at operations on both clean and contaminated wounds. The result was a gratifying decrease both in the incidence and the severity of sepsis.—J. M. ROBSON.

—. (1944). **The Use of Penicillin in Treating War Wounds. (Instructions prepared by the Penicillin Clinical Trials Committee).**—*War Memo. med. Res. Coun. Lond.* No. 12. pp. 16. London: H.M. Stat. Off. [3d.] **2082**

Penicillin has remarkable antiseptic and chemotherapeutic properties and is practically non-toxic to tissues. The supplies are, however, limited, and it has therefore to be used as effectively and as economically as possible. The memorandum describes the methods of giving this drug in the treatment of war wounds. Organisms highly susceptible to the action of penicillin are *Staphylococcus aureus*, *Streptococcus pyogenes*, the pneumococcus, *Clostridium welchii*, *Cl. septicum*, *Cl. oedematiens*, and *Cl. tetani*, *Neisseria gonorrhoeae* and *N. meningitidis*, *Bacillus anthracis*, and *Corynebact. diphtheriae*. Methods of making up solutions and creams and of using penicillin powder are described. The solution is administered systemically while the cream and powder are applied locally. Particularly good results are obtained in surface wounds and burns and in soft tissue wounds, provided that adequate surgical treatment is also applied. Difficulties in the treatment of fractures and of certain types of soft tissue wounds are described. The importance of bacteriological examination of the wound is stressed, and methods are given for titrating the potency of penicillin solutions and the penicillin content of blood. There is a short bibliography of relevant publications.—J. M. ROBSON.

ALSTON, J. M. (1944). **Use of Crude Penicillium Filtrate for Local Treatment.**—*Brit. med. J.* May 13th. 654–656. **2083**

Crude penicillin solutions containing 4–10 units per ml. can be dependably produced and assayed in a bacteriological laboratory. They have been applied locally, either soaked in gauze or made up in a cream, to various types of septic lesions. In the majority of cases satisfactory results were obtained. Such a preparation might well be of value in veterinary work. It has also been found that *Pseudomonas pyocyanea*, which is insensitive to penicillin, frequently invades lesions treated by penicillin. It is suggested that a 4% boric acid lotion might be of value in such cases.—J. M. R.

ROSSITER, R. J. (1944). **Controlled External Pressure and Oedema Formation.**—*Lancet.* **246.** 9–11. [With a note by R. A. PETERS]. **2084**

The use of external pressure has recently been advocated in the treatment of burns. By means of an air cuff external pressure of the order of 10 mm. of Hg was applied to experimental burns made by a hot iron on the skin of anaesthetized g. pigs. Oedema was greatly reduced. Tannic acid, either alone or followed by silver nitrate, and triple dye were without effect on the formation of oedema. Both ears of rabbits were burned by immersion in water at 65°C. for 1 min.; pressure applied by a cuff to one ear greatly reduced oedema as compared with the control ear. Pressure was most effective if applied immediately after burning but was still effective if applied three hours later when, in the case of the skin burns in g. pigs, oedema formation was complete.—E. G. WHITE.

VALKO, E. I., & DUBOIS, A. S. (1944). **The Antibacterial Action of Surface Active Cations.**—*J. Bact.* **47.** 15–25. **2085**

The antibacterial actions of certain surface active cations such as zephiran (mixed alkyl-dimethyl-benzyl-ammonium chlorides), cetyl-pyridinium bromide, and N stearoyldiethylenetriamine lactate on *Staphylococcus aureus* and *Salmonella typhi* are neutralized by equivalent amounts of anionic soaps such as sodium dodecyl sulphate. The antibacterial action of acriflavine is also reversed by the addition of high molecular anions. These antagonistic effects can be considered as cases of ionic exchange by bacteria.

—E. BOYLAND.

SALLE, A. J. (1943). **Effect of Repeated Applications of Sublethal Concentrations of Germicides on Living Embryonic Tissue Fragments.**—*J. Pharmacol.* **79.** 271–280. **2086**

Chick heart tissue fragments were incubated in rabbit plasma, Tyrode's solution and embryonic extract. Twice daily, germicides were introduced, incubated for 10 min., and withdrawn; the procedure was continued for 12 days. The condition of the fragments was recorded photographically and at the end of the period transplants were made to ascertain whether the tissues were still living. The object was to demonstrate possible cumulative action on proliferating tissue by various germicidal substances. Iodine and hexylresorcinol showed no effect on the tissue; merthiolate, metaphen, silver nitrate and "silver protein strong" caused damage to fibroblasts but, except in the case of silver nitrate where a slow action was demonstrated, there was no effect on the tissue fragments; mercuric chloride caused death of the tissue fragments in 72 hours.—RACHEL MARSHALL.

HYGIENE AND PUBLIC HEALTH

—. (1937). **Conference on Cooperative Meat Investigations. State Agricultural Experiment Stations, United States Department of Agriculture, and the Livestock and Meat Industry, Participating. Report of Review Committee.**—Unpaged. 2 Vols. [4to] [Mimeographed]. 2087

Arising from a joint meeting in May 1925, between the U.S. Department of Agriculture and the State Experimental Stations in St. Louis, Missouri, a national committee on the quality and palatability of meat was appointed. The committee was discontinued in 1931, but with the help of the National Livestock and Meat Board, various institutions co-operating on meat researches organized an annual summer conference. Progress reports on work done were made.

At the 1935 conference, a review committee was formed for preparing reviews and summaries of results, both published and unpublished, since 1925. About 450 abstracts were prepared and submitted to the 1937 conference. These abstracts are produced in two volumes in mimeograph and are well and concisely presented with excellent tabulation. The grouping of associated subjects generally facilitates reference. The sections on beef show valuable tables on cattle, but the percentage might have presented a clearer picture if the analysis had been carried out on an "empty" live weight basis as the degree of "fill" can materially vary. The bone and tendon figures appear to be somewhat higher than those found in Great Britain but this might have been caused by including all tendon, whereas in Great Britain some of the tendon, *e.g.* on leg of beef, etc., is normally sold with meat. The method of expressing a ratio of total edible to bone appears to be a good practical method of comparison for various breeds and types. Fat appears to agree closely with comparable animals in the United Kingdom.

The section on pork covers the subject very comprehensively, dealing with it under 20 main headings.

Regarding hams, the questions of maturing and chemical and physical changes receive some attention. Valuable information is given regarding the rate of salt penetration, loss of moisture and formation of free fatty acids. Canned ham contained nearly 60% of moisture, which was reduced after one year to 45%, and after two years to 40%. Fatty tissue drops from 9% at one month to 4% at one year, with subsequent negligible loss.

Some interesting work on the biological value of proteins is given, *e.g.* tender loin is assigned a value of 79, compared with a value of 25 for cracklings; pork is generally about 74.

More information regarding cutting methods for lamb would be necessary to obtain a true comparison with British types, but superficially it appears that quality in Great Britain is somewhat higher.

The effect of various diets on growth and the quality, mineral, and vitamin content of meat has been the subject of considerable work, most of which, however, is indicated merely by lists of references to the subjects investigated.—H. E. Bywater.

—. (1943). Deutsches Reich. Runderlass des Reichsministers des Innern, betr. Zulassung von Schlachthäusern für die Ausbildung von Fleischbeschauern und Trichinenschauern; hier: Anerkennung der Lehrgänge als Ersatzzeit in der Reichsversicherung. **[Germany: Circular Concerning Provision of Abattoirs for Training of Meat and Trichinosis Inspectors].** —*Reichsgesundheitsblatt.* **18.** 729–730. 2088

The circular states that, as required by the decree of the 24th June 1940 [published in *Reichsgesundheitsblatt.* **15.** 651. (1940)], the State insurance office issued a list of the abattoirs, provided for the training of meat inspectors and trichinosis inspectors, at which the courses of instruction were officially recognized as fulfilling the regulations. Additions to the list have to be reported directly to the State insurance office.

—T. E. Gibson.

Sohier, R., & Jaulmes, C. (1943). Epidémie de toxi-infection alimentaire d'origine porcine due au paratyphique C type "Cholerae suis Kunzendorf". **[Food Poisoning Outbreak of Porcine Origin Due to *Salmonella cholerae-suis*].**—*Pr. méd.* **51.** No. 2. 10–11. 2089

An outbreak of acute gastro-enteritis is reported in 178 persons who had consumed meat from pigs slaughtered in poor condition. Bacteriological examinations could not be made, but the results of serological tests suggested *S. cholerae-suis* as the causative organism. In addition, the organism was isolated from pigs reared on the same premises as those incriminated in the outbreak.

TECHNIQUE AND APPARATUS

Galle, E. (1943). Kriegswirtschaftlich bedingte Aenderungen in der Herstellung unserer Bakteriennährböden. **[War Economy Measures in the Preparation of Culture Media].**—*Zbl. Bakt. I.* (*Orig.*). **150.** 345–348. 2090

G. confirms the value of Bartel's [*V. B.* **12.** 617.] method for the recovery of agar for further use.

Owing to the shortage of glycerin, an alternative was sought for glycerolate, containing 1 part glycerin and 2 parts blood, used in the preparation of Clauberg's medium. By the substitution of chloroform added to blood in the proportion of 1 : 10, G. has had very good results, covering over 1,000 nose and throat swabs.

—N. S. Barron.

Seelemann, M., & Meyer, A. (1943). Zur Frage des Ersatzes von Nähragar durch Hefeextraktagar und zur Eignung des sog. rückgewonnenen Agars zur Bakterienzüchtung. **[Substitutes for Agar and Use of Recovered Agar in Bacterial Cultivation].**—*Zbl. Bakt. I.* (*Orig.*). **150.** 349–352. 2091

The authors did not obtain the satisfactory results with yeast-extract agar reported by Liebmann [*V. B.* **13.** 36]. Although organisms of the colon-typhoid group, enterococci, staphylococci, and a number of milk-souring streptococci grew satisfactorily, more sensitive organisms such as haemolytic streptococci and *Brucella abortus* did not, and the medium was not as good for original isolation from tissues as meat-broth agar. No difference was found between yeast-extract broth and yeast-extract agar.—N. S. Barron.

Bartel, H. (1943). Verfahren zur Rückgewinnung des Agar-Agar aus gebrauchten Nährböden. **[Reclamation of Agar from Used Culture Media].**—*Zbl. Bakt. I.* (*Orig.*). **150.** 336–344. [See also *V. B.* **12.** 617]. 2092

Details are given of the methods employed for the recovery of agar from used medium. The material is treated for several days with chloramine solutions to destroy organisms and any colouring agents present, washed in running water to remove soluble material, and finally dehydrated to the required degree before being incorporated into fresh media.—N. S. Barron.

VERA, H. D. (1944). **A Comparative Study of Materials Suitable for the Cultivation of Clostridia.**—*J. Bact.* **47.** 59–69. **2093**

In view of the successful use of a few enzymic digests of animal and vegetable materials for culturing the common anaerobes, an investigation was made of the relative values of a large assortment of such materials when treated by several enzymes. Special attention was paid to the requirements of butyric-acid and butyl-alcohol-producing clostridia as well as of the pathogens such as *Cl. novyi, Cl. septicum* and *Cl. tetani.* Among the animal materials tested were heart muscle, casein, skimmed milk, eggs, and blood clot, while meals made from soya beans, peanuts, tomatoes, and cotton seeds were among the sources of vegetable materials. The enzymes used included trypsin, pepsin, and papain. Fluid media consisted of 2% of the chosen dehydrated digest together with the following standard ingredients :– dipotassium phosphate 0·2%, sodium thioglycollate 0·1%, glucose 1%, methylene blue 0·0002%, agar 0·05%. To prevent the death of stock cultures owing to excess acid formation, about 0·1 g. $CaCO_3$ was included in each tube of medium used for such species as *Cl. welchii* and *Cl. butyricum.* Many of the materials after digestion with certain of the enzymes permitted the regular growth of small inocula of the clostridia. Tryptic digest of casein was excellent. Papaic digest of eggs and tryptic digest of blood were satisfactory. Soya-bean meal when digested by either papain or pepsin proved to be the best vegetable source. The digests which were found to be suitable when in fluid medium were equally good for inducing good surface colonies on solid medium.—J. KEPPIE.

FREIMAN, D. G., & MOKOTOFF, G. F. (1943). **Demonstration of Tubercle Bacilli by Fluorescence Microscopy. A Comparative Evaluation of the Fluorescence and Ziehl-Neelsen Methods in the Routine Examination of Smears for Acid-Fast Bacilli.**—*Amer. Rev. Tuberc.* **48.** 435–442. [Spanish summary]. **2094**

In the examination of a large number of samples of tuberculous material such as sputum and gastric concentrates, the efficacy of fluorescence microscopy was compared with the results from the parallel use of the Ziehl-Neelsen method (brilliant-green counterstain). In the former, auramine-O and a 4 mm. objective were used according to the method of RICHARDS & MILLER. Every slide was examined for 5 min. It was concluded that except in the examination of gastric concentrates, the fluorescence method was not significantly superior to the Ziehl-Neelsen method, because it did not facilitate diagnosis and it was found to require an appreciable amount of practice and careful focussing. It was also considered to cause more fatigue. It is admitted that the fluorescence method is simpler and that the use of the relatively low-power objective encourages the close study of particles of sediment in a thin film. It was also confirmed that culture methods are more satisfactory than either of the above staining methods.—J. KEPPIE.

HAMMOND, D. M., & DAVIS, L. R. (1944). **An Improved Method for Sporulating Oocysts in Bovine Fecal Material.**—*Amer. J. vet. Res.* **5.** 70–71. **2095**

The mass of faecal material was reduced by $\frac{1}{4}$–$\frac{1}{2}$ by the use of a series of five screens to remove some of the coarser debris. The advantages of this lay in reduced sedimentation during aeration and in lessened difficulty in estimating the number and concentration of oocysts in the material. After screening, the sediment was transferred to tubes of 675 ml. capacity, and aqueous 2% potassium bichromate solution was added. A small aquarium aerating pump was connected with the tubes and the stream of bubbles emanating from it agitated and aerated the suspension. The percentage sporulation was greater and more uniform than that obtained by other methods.—C. HORTON SMITH.

FIELDING, J. W. (1943). **Typhus : Modified Breinl Method for Staining Rickettsiae and Other Inclusions.**—*Med. J. Aust.* May 15th. 435–437. **2096**

A differential staining method for rickettsia and inclusion bodies is described in detail. The method is applicable to smears and sections of animal and arthropod material and may be used for re-staining old faded smears ; it is stated to be superior to other techniques for each type of material. A technique is also described for obtaining serial sections of ticks.—D. F. STEWART.

KING, E. J., GILCHRIST, M., & DELORY, G. E. (1944). **Accuracy of Haemoglobin Methods.**—*Lancet.* **246.** 239–243. **2097**

Iron analyses and oxygen capacities of whole-blood samples and solutions of washed haemolysed red cells were used to assess the accuracy of colorimetric haemoglobin methods. The cyanmethaemoglobin method was somewhat more accurate than the alkaline haematin and carboxyhaemoglobin methods and is recommended for research purposes rather than for routine use on account of the use of cyanide ; the last two methods were only slightly less accurate and of them the alkaline haematin method is particularly suited to routine work because it estimates abnormal as well as normal haemoglobin.—RACHEL MARSHALL.

ASHFORD, C. A. (1943). **Observations on the Acid Haematin Method for the Estimation of Haemoglobin.**—*Brit. med. J.* Nov. 6th. 575–577. **2098**

The formation of acid haematin from whole blood of ox and man at room temperature (14°–18°C.) was rapid in the first 10 min. and then slowly attained a maximum value in about two hours. The time when comparison of the colour with a standard is made is thus very important. The maximum colour was attained in 10–15 min. at 40°–45°C. ; therefore heating at this temperature is recommended for routine work. The use as a standard of acid haematin recently prepared from ox or human blood of known oxygen capacity, rather than from a stock solution of acid haematin, is recommended.—RACHEL MARSHALL.

PETERSON, J. M., & STRANGEWAYS, D. H. (1944). **Estimation of Haemoglobin by Photo-electric Absorptiometers.**—*Brit. med. J.* Jan. 8th. 43–44. **2099**

Objections to the use of photo-electric absorptiometers for estimating concentration of haemoglobin may be met if two photo-electric cells are employed. The one, receiving light through a standard filter and adjustable slit is balanced against the other to give a null reading on the galvanometer. The standard is then replaced by the blood solution and the slit adjusted again to give the null reading against the other cell. The standard is then replaced and the slit position checked. Changes in the intensity of light and the electric properties of the cell are thus believed not to interfere with the results. The use of an alkaline haematin method is recommended employing a filter giving absorption in the range 430–540 mμ.—R. M.

KING, E. J., GILCHRIST, M., & MATHESON, A. (1944). **The Haemoglobin Equivalent of the B.S.I. Haldane Standard.**—*Brit. med. J.* Feb. 19th. 250–252. **2100**

The Haldane colorimetric standard of the British Standards Institution is believed to represent a higher haemoglobin concentration than is supposed. The observation is based upon comparison with haemoglobin determinations by iron content.—RACHEL MARSHALL.

See also abstr. **1888** (cultivation of salmonella), **1966** (viability criteria for leucocytes), **1995** (haemoglobinometry).

MISCELLANEOUS

CAMARGO, F. (1944). **Livestock Sanitary Service of Mexico.**—*J. Amer. vet. med. Ass.* **104.** 2–3. **2101**

All veterinarians in Mexico graduate from the National University of Mexico. The agricultural department of the Federal Government operates two bureaux, the Bureau of Animal Industry and the Bureau of Animal Research, both staffed by veterinarians.

The Bureau of Animal Industry is responsible for the development of animal husbandry; it supervises six national experimental stations all under veterinary supervision. The Bureau of Animal Research, besides conducting research, is responsible for the preparation of sera, vaccines etc. Both bureaux co-operate in controlling biological and pharmaceutical veterinary products.

There are available at present only a few hundred veterinarians to deal with a domestic animal population of 39,000,000. Immediate increase in the number of veterinary graduates from the University is therefore regarded as a matter of urgency.—D. D. OGILVIE.

WRAGG, W. G. (1944). **Agriculture and the Veterinary Profession. A Reverie.**—*Vet. J.* **100.** 26–31. **2102**

In a general article, W. discusses the relationship between agriculture and the veterinary profession. Special attention is directed to the prevalence of certain diseases and the influence of legislation and voluntary schemes upon their incidence. Disappointment is expressed at the slow progress of the Tuberculosis (Attested Herds) Scheme and at the failure of the Government to implement the proposals of the Agricultural Act, 1937, Part IV, for an animal disease eradication campaign.—D. D. OGILVIE.

BLAIR, J. S. (1943). **The Problems of Pig Clubs in War-time.**—*Vet. Rec.* **55.** 445–446. Discussion pp. 446–448. **2103**

Most pig club members are inexperienced in pig keeping, and therefore require guidance and advice which can best be given by a veterinary surgeon. The first problem is buying, and stock of the right type should be bought from a known healthy source. To overcome this difficulty, B. advocates that where possible clubs should breed their own replacements. The difficulty of rearing pigs, particularly on swill, from the time of weaning to 3½ months of age is stressed.

B. then describes the various types of improvised pig sties used, giving their advantages and drawbacks, and advises the use of straw for bedding. Swill, he states, is most conveniently fed in the concentrated cooked state (pudding). This pudding should be introduced very gradually into the meal fed to weaners, and supplemented by fish meal and cod-liver oil. Older animals should have an occasional meal feed to prevent constipation. It is claimed that a healthy pig at eight weeks old should weigh 40–50 lb. and at 5–6 months 220 lb., when it should be slaughtered. The dangers from disease in these clubs is pointed out, the commonest being acute swine erysipelas in older animals, and necrotic enteritis in young stock. Swine fever is not serious where pigs are bought from a disease-free source.—W. J. MCILROY.

REPORTS

AUSTRALIA, TASMANIA. (1942). **[Report of] Animal Health Service [1941–42].**—*Rep. Dep. Agric. Tasm., 1941–42.* pp. 6–9. **2104**

Nationalization of veterinary services has been in operation for 18 months, and in spite of wartime conditions has been an unqualified success. Control is discussed of PULLORUM DISEASE, of BLACK DISEASE and ENTEROTOXAEMIA of sheep, and of TUBERCULOSIS, BLACKLEG, CONTAGIOUS ABORTION, and JOHNE'S DISEASE of cattle. Field investigations on diseases related to deficiencies of trace elements were extended, with outstanding results from the use of copper and cobalt. On King Island "FALLING DISEASE" has been related to a deficiency in blood copper. Statistics for the numbers of specimens for each disease examined and districts concerned are tabulated. The following conditions are reported in Tasmania for the first time:—SWINE ERYSIPELAS, DYSENTERY in calves thought to be due to a flagellate, mite (*Psorergates ovis*) infestation of sheep, PENTASTOME larvae in the liver of a sheep, and OEDEMA of the wattles of poultry. *Linognathus pedalis* has appeared in sheep on Flinders Island.—H. MCL. G.

U.S.A. (1942). **Third Annual Report of the Regional Poultry Research Laboratory, East Lansing, Mich., July 1, 1941–June 30, 1942.** [WINTON, B.] pp. 16. [4to] [Mimeographed]. **2105**

The object of the laboratory is to investigate the possibility of the prevention and control of the avian leucosis complex through the application of genetics, pathology, physiology, dietetics, and husbandry. The seriousness of this problem to the poultry industry is apparent from the fact that of 57 million hens which died in the U.S.A. in 1942, 21 million deaths were attributed to leucosis.

In the breeding stock at the laboratory, 21% of the chickens died from leucosis before 300 days of age. This is an increase on previous years and it is suggested that genetic segregation is now occurring. There are several families among the matings which show less than 10% mortality and it is hoped to select and improve these strains, while at the same time to retain high hatchability and to uncover many inherited defects which may be ultimately eliminated. The highest mortality rate due to leucosis occurred in certain families of White Leghorns. An account is given of the method of propagating leucosis and the factors which determine the variability in reaction of inoculated fowls.

The birds in the laboratory are remarkably free from the more common diseases, except coccidiosis which was accidentally introduced in 1939. This freedom is attributable to the elaborate and strict quarantine measures carried out.

Of the 700 birds studied, 73·5% had lymphomatosis in some form, made up as follows:—neural 30·48%, visceral 58·44%, ocular 9·51%, and osteopetrotic 1·55%. A comparison showed that 44% of the cases appeared macroscopically to be normal were shown upon microscopic examination to be affected with lymphomatosis; 9% were classed as "doubtful". The distribution of microscopic lesions ranges from the highest incidence (60%) in the eye, then in the following order:—nerves, liver, brain, gizzard, adrenal, heart, kidney, lung, duodenum, ovary, spleen, pancreas, ileocaecal valve, and testicle (7·25%).

Finally, a brief note is given describing studies of the physiological anatomy of the eye and an outline of other work in progress, consisting of an investigation into the properties of the agent or agents concerned in the leucosis complex.—JOHN G. CAMPBELL.

BOOK REVIEWS

BOYD, W. C. [Ph.D., Associate Professor of Biochemistry, Boston University, School of Medicine]. (1943). **Fundamentals of Immunology.** pp. xiv + 446. 45 figs. New York, N.Y.: Interscience Publishers, Inc. [8vo] [$5.50]. **2106**

This volume, intended primarily for the beginner, but with many small-type sections which will be of considerable use to the more advanced student and the research worker, represents an objective and up-to-date account of the science of immunology. The subject is not approached from a historical angle and many old and now obsolete concepts are not discussed: this method, while it is open to criticism on the ground that a student who has no knowledge of the historical development of a science loses something in the understanding of current conceptions, results in a text in which facts are plainly stated and modern theories clearly outlined and discussed.

The book contains 11 main sections in which are discussed the kinds, grades, measurements, and mechanisms of immunity in general, antigens, antibodies and their reactions, modern concepts of blood-grouping, complement and complement fixation, anaphylaxis and allergy, practical uses of artificial immunity, and laboratory and clinical technique. The sections on the immunochemical nature of antigens and antibodies and the mechanisms of antigen-antibody reactions are very well prepared, and include an excellent discussion of the relative merits of MARRACK's lattice hypothesis and of the occlusion theory recently proposed by BOYD. The final 90-page section on technique contains much information which should be of value to those responsible for practical classes in immunology. It deals with apparatus, the technique of injecting and bleeding animals, the preparation of material for clinical use, clinical diagnostic tests, the titration of toxins and antitoxins, and the more theoretical demonstration of the properties of antigens and antibodies.

Two very minor criticisms of the book might be that, in spite of its 446 pages, the immunology of specific infectious diseases is only very shortly referred to and that, with its rather chemical bias, the title of the text might better have been "Chemical Fundamentals of Immunology".

As an up-to-date, well documented, and intelligent approach to the involved problems of modern immunology, this volume would appear to be well worth the thorough study of those wishing to acquire knowledge of this field, and it can be confidently recommended to student and teacher alike.—J. LOCHIEL MCGIRR.

DRINKER, C. K. [Professor of Physiology and Dean of the School of Public Health, Harvard University]. (1942). **Lane Medical Lectures: The Lymphatic System. Its Part in Regulating Composition and Volume of Tissue Fluid.** pp. 101. 29 figs. Stanford University, Calif.: Stanford University Press; London: Humphrey Milford, Oxford University Press. [8vo] [14s.] **2107**

This is the 28th series of Lane Medical Lectures since they were established in 1896. The lecturers have included such names as Michael Foster, William Welch, Patrick Manson, Edward Schafer, Ludwig Aschoff, and Thomas Rivers.

In the five lectures comprising this series, there is first a brief account of the gradual evolution of the closed vascular system from the more primitive condition in which external fluids have free access into the body—the development of a constant internal environment in spite of ever greater variations in external environment. The second lecture is devoted to a historical account of the development of knowledge of the capillary circulation from the time of William Harvey, and is followed by a similar chapter dealing with lymphatic vessels.

Chapter 4 illustrates the interdependence of the blood and lymph circulations and includes a brief account of recent work on the lymph flow from the heart and lungs, a subject to which the author has made important contributions.

The final chapter is of special interest to clinicians and pathologists. The author applies recent knowledge of the lymphatic system to problems of medicine and surgery, stressing the importance of adequate lymph flow in the healing of wounds and the probable importance of lymphatic obstruction caused by inhaled dust in the production of lung fibrosis (pneumonoconiosis).

The historical accounts included in the first four chapters are made more valuable by the inclusion of a number of plates reproduced from the publications of Malpighi, van Leeuwenhoek, Schwann, Aselli, and others.

This work forms a valuable companion to the recently published volume on the lymphatics by DRINKER & YOFFEY [*V. B.* **12.** 478].—E. G. WHITE.

DUKES, H. H. [D.V.M., M.S., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University]. (1943). **The Physiology of Domestic Animals.** pp. xiv + 721. 168 figs. Ithaca, N.Y.: Comstock Publishing Company, Inc. [5th Edit., Revised] [8vo] [33s.] **2108**

This book is so well known to veterinarians that it is hardly necessary to review its contents or stress its value. The new edition has been carefully revised and to a considerable extent re-written. A useful addition is a chapter dealing with digestion in the fowl and various sections dealing with other aspects of avian physiology. For those desiring further information there are numerous references at the end of each of the ten parts into which the text is divided.

For the student, Dukes's book should not be used to the exclusion of the several excellent text-books of human physiology, for the latter give a more adequate account of the principles of physiology. Dukes's book is to be regarded as complementary to the standard medical texts and for this purpose is of the greatest value, not only during student days but also afterwards as a work of reference.

This work should be consulted by all interested in the physiology of animals.—E. G. WHITE.

REESE, A. M. [Professor of Zoology, West Virginia University]. (1942). **Outlines of Economic Zoology.** pp. xii + 359. 191 figs. Philadelphia: Blakiston Co. [4th Edit.] [8vo] [$3.25]. **2109**

There is a tendency in Great Britain to think of economic zoology as comprising helminthology and applied entomology, and any work which combats this idea deserves sympathetic consideration. The author of the present book is to be congratulated on making an attempt to include within his material every group of animals from Protozoa to Mammalia. Unfortunately, so small a book demands very careful choice of material, and the fact that more space has been devoted to the Coelenterata and Echinodermata than to the whole of the Platyhelminthes shows that sufficient care has not been exercised. This fault, coupled with an abundance of commonplace remarks—*e.g.* in referring to elephants: "These huge, thick-skinned (pachyderm) animals are familiar to all"—renders the book of little value to the serious student, although it may be of some use to the general reader looking for a simple introduction to both pure and applied zoology.—J. B. CRAGG.

See also abst. **1982** (vitamins and hormones).

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